October 1970

Smithsonian

Back in Mexico: a plundered Maya temple facade.
The scandal of artifact thievery (page 8)

October 1970

Smithsonian

Volume 1, Number 7

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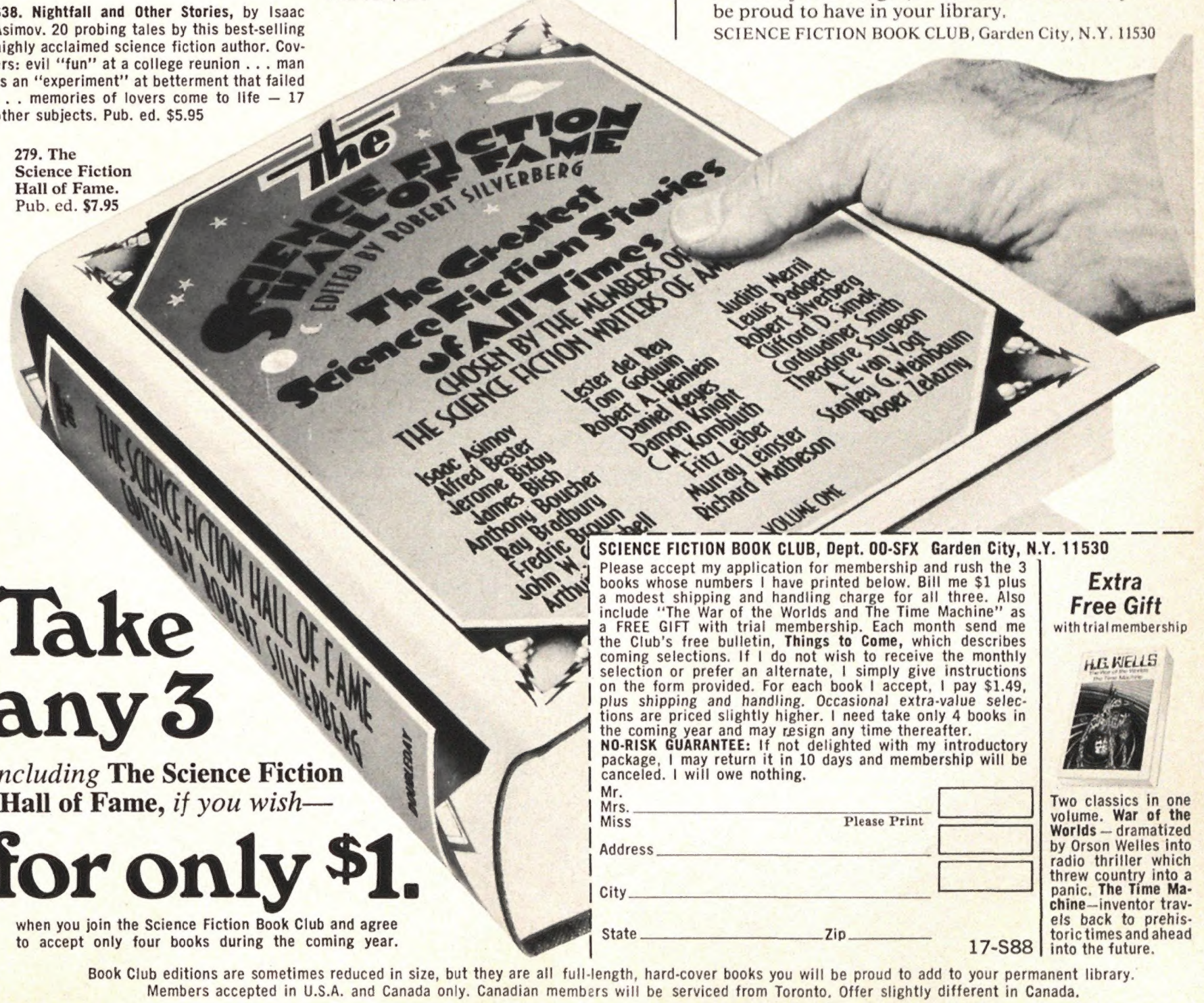

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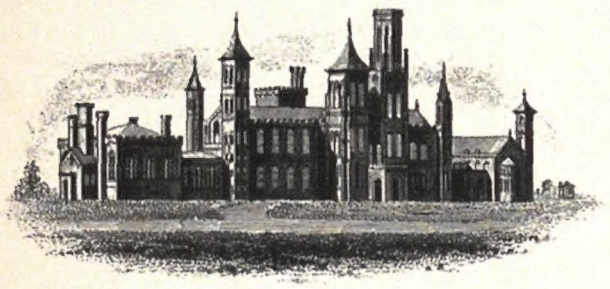
Secretary Ripley's comments

The view from the castle



At last we have a National Portrait Gallery, and a rare opportunity to develop a new kind of resource for the study of our history

An English essayist of the 19th century remarked of portraits that "A good portrait is a kind of biography, and neither painter nor biographer can carry out his task satisfactorily unless he be admitted behind the scenes." It has been a tragedy for the United States that over the years no single influence was brought to bear on the horrid fact that we had never been able to develop a National Portrait Gallery.

No one in this country really stirred himself, I am afraid, until 1919. In that immediate postwar year Herbert L. Pratt, then a vice president of the Standard Oil Company, vigorously proposed the commissioning of portraits of the leaders of the Allies, which could become, as he said, "the nucleus of a great American Portrait Gallery similar to that in London." Smithsonian Secretary Charles Walcott championed the idea, and the funds were raised to send eight artists to paint 23 of the participants at Versailles.

Thus the stage was set for a National Portrait Gallery to become a fact, but nothing came of it—nor of various attempts made in succeeding years. During the Congressional hearings in 1937 on Andrew Mellon's gift to the nation of his great collection of paintings, which resulted in the National Gallery of Art, the subject came up again.

The trustees of the new National Gallery often debated the issue of a portrait gallery, and even drew up a proposed joint resolution of the Congress to save an old courthouse building in downtown Washington for the purpose, but this proposal, too, died aborning.

It remained for my predecessor, the seventh Secretary, Dr. Leonard Carmichael, aided by the zeal of a number of Regents, notably Senator Clinton Anderson, as well as our indefatigable friend David Finley, to institute action to save the old U.S. Patent Office Building as a home for the National Portrait Gallery, so long a dream of the Institution.

The first Director, the well-known museum figure Charles Nagel, aided by a Commission, laid out the ground rules to everyone's satisfaction. What was clear from the outset was that this Gallery must become the great American research center of iconographic biography, and that, having come into being perhaps 30 years too late as far as the art market was concerned, it could not model itself on the existing trio of galleries in Dublin, Edinburgh and London, but must pioneer on its own.

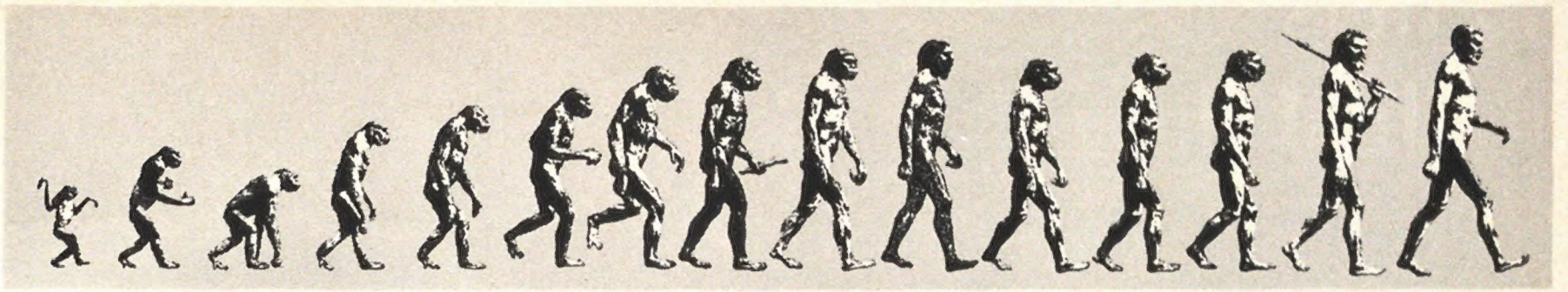
In the first place, the Gallery must gradually develop into an international resource for the study of the total environment of our forefathers. What was the manner of speech and dress, who were the families and associates, of all who helped to create America?

In the second place, the Gallery must be a vital, changing panorama of themes and exhibitions which will help to bring alive the American past, as does next month's exhibition of portraits of John Quincy Adams (see pp. 24-33). Let this not be a somnolent place, but rather one to "tell it like it is"—and was.

Under its new Director, Marvin Sadik, we can feel assured that the National Portrait Gallery will look into the past and discover, for all the people, the shape of things "behind the scenes."

S. Dillon Ripley

THE MOST ASTONISHING DETECTIVE STORY IN HISTORY—



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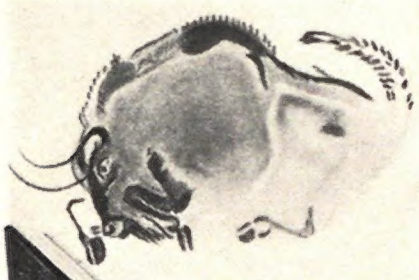

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Letters to the Editor

Asimov's 'laws,' continued

Dear Sir: Dr. Asimov—whom I admire enormously—did his usual delightful and informative job on thermodynamics in the August issue, but there is a third discouragement. Not only is it true that you can't win and can't even break even—but you also can't get out of the game!

E. Scott Barr

Tuscaloosa, Alabama

Dear Sir: If energy is neither created nor destroyed and matter is neither created nor destroyed, tell us, please, just what is created or destroyed?

Sol Halpert

Miami, Florida

Author Asimov's answer: "An author punches shapes on paper, transferring ink from the ribbon. No ink is created, no ink is destroyed, but the patterns of the shapes he punches create ideas, destroy others, and may change the world. The atoms that make up a human being are just about indestructible. The same atoms found today in one man were found a week ago in a steer, a hundred million years ago in a pterodactyl or a stone. And a hundred million years from now, who knows where? But every moment the pattern of atoms changes and in every human being the same old atoms are in a new pattern that makes us all different. If the basic raw material of the Universe is neither created nor destroyed, what is created or destroyed? Everything!" Ed.

Dear Sir: Isaac Asimov's article on thermodynamics is terrific—the best nontechnical description I have read. But what I can't understand is why he himself doesn't believe it. It is amazing to me how he can take almost seven pages to convince us of the validity of the first and second laws of thermodynamics and then overthrow the belief in one page.

Another chemist, professor, writer—Donald E. Chittick—has said, "Again the Second Law does not say that life via chance is impossible but rather that it is improbable. One might ask then: 'Do men of science seek a probable or an improbable explanation for things?' "

Everett H. Peterson

San Jose, California

The process whereby life develops out of chaos is a great mystery whether you approach it as theologian, artist or scientist. Dr. Asimov, far from contradicting himself, covered his part of the story, the thermodynamics, by saying, "In the billions of years that it took for the human brain to develop, the increase in entropy that took place in the sun was . . . far, far *greater than the decrease that is represented by the evolution required to develop the human brain."* Ed.

Dear Sir: The Asimov article raises these questions: 1. Are atoms and elementary particles perpetual-motion machines? If not, what are they? 2. Do nuclear piles breed nuclear material? Does this defeat entropy?

J. Rochuen

Miami, Florida

In the sense of a device from which one can take energy by violating thermodynamic laws, atoms and elementary particles are not perpetual-motion machines. Breeder reactors make atoms that will fission and thus serve as nuclear fuel out of atoms that will not fission readily enough to serve the purpose. Breeding is analogous to the decay that makes living plants into such fuels as coal, petroleum and natural gas, and both processes are subject to the law of increasing entropy. Ed.

Boomerangs

Dear Sir: While it may generally be true that nothing is known about their evolution, boomerangs were used by the Egyptians over 3,300 years ago for hunting small game and wildfowl. A number of such objects were found by Dr. Howard Carter in 1922 when he opened the tomb of King Tutankhamen. Some of these ancient boomerangs are not simply throwing sticks. They have the definite chevron shape of a weapon intended to come back to the thrower.

John V. Hennessy jr.

Elmhurst, New York

Pre-Columbian art

Dear Sir: Surely Xipe-Tótec, the rain god among the treasures of Mesoamerica, is wearing a feather-covered skin to insure dryness rather than a flayed one.

Marjory W. DePuy

Washington, D.C.

It does look like a coat of feathers. But the American Museum of Natural History says that the scale-like covering is "probably a stylization of dried skin." Ed.

The C & O Canal

Dear Sir: The traverse of the C & O Canal which Mrs. Geary and her husband made on a tandem bicycle brought back memories to my husband and me, for we have walked the entire length of the towpath. We started in 1956 but made little headway during that year and the next, getting only as far as Seneca. However, in the spring and fall of 1968 and the spring of 1969 we did some concentrated walking on weekends and reached Cumberland in early May 1969.

Edith C. Wilkerson

Arlington, Virginia

Detergent debate

Dear Sir: Your "Detergent debate" deserves the usual high rating of all your

(Continued on page 6)

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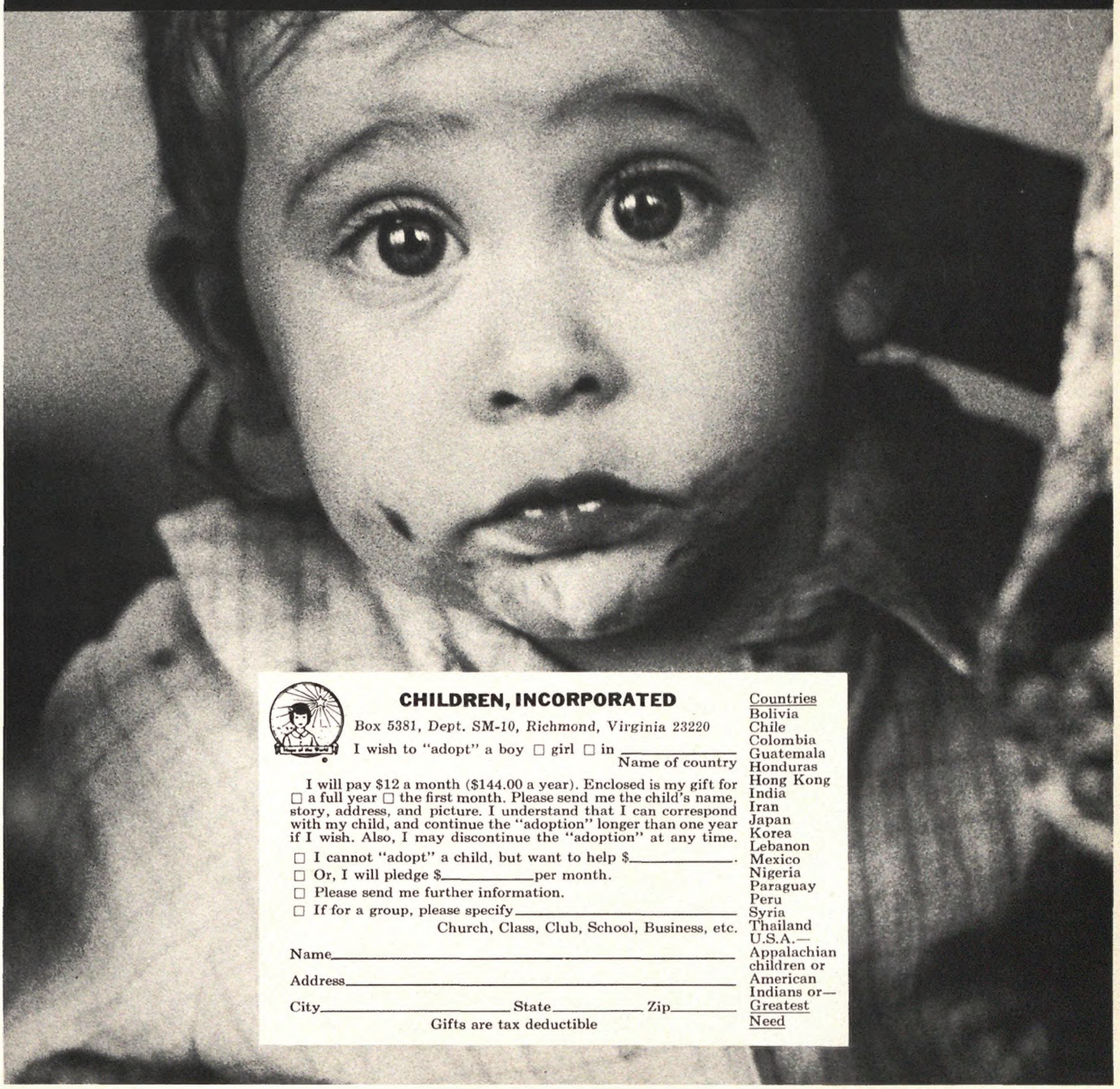

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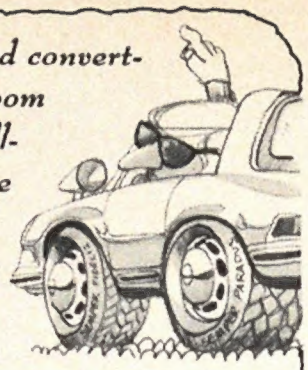
Greatest Need

He drives a red convertible. His bedroom has yellow wallpaper. He's the HIGH-BID* *champ of the neighborhood. Should he pay cash for the 200-year-old cigar box he found at the auction?*



She wears a pigskin coat. She manufactures bowling balls. She plays THINKING MAN'S GOLF* *What are her odds for landing a pro quarterback?*

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(Continued from page 4)

articles. But, from my experience, soap-washed clothes need not be gray. About five years ago I found that I was allergic to detergents. So, I switched back to soap. My first laundries were disappointing—not white and with soap scum visible in the machine and laundry tub. Then I remembered that my grandmother always used vinegar or lemon rinses when shampooing, to remove the soap residue where the water was hard. I purchased a gallon of white distilled vinegar, poured some in the rinse cycle—eureka!—white wash, no scum. This I used in addition to a water softener in the wash cycle.

MRS. MARION L. BATEMAN
Los Angeles, California

Dear Sir: In behalf of the Jackson Chapter of Zero Population Growth which is concerned with the quality of life, thank you for your recipe for nondetergent laundering.

MRS. GRETCHEN MARSHALL
Jackson, Michigan

Boston Museum

Dear Sir: In your article on the Boston Museum [July issue], I would like to know in Tiepolo's *Time Unveiling Truth,* why the lady's toes on her left foot are going the wrong way? It bothers me.

MRS. ARTHUR KRAUS
Los Angeles, California

Look at the painting again in the following way: Truth is sitting sidesaddle, so to speak, in Time's lap, rather than astride. It then becomes her right leg; the left is hidden under the drapery beneath her left arm. Ed.

Dandelions

Dear Sir: I think I have seen a use for dandelions which Mr. Breisky did not mention in his article.

In Munich in the fall of 1930, Wagner's *Ring* was produced at the National Theatre and the Fafner who appeared in *Siegfried* was a particularly splendid dragon, belching great volumes of flame at regular intervals. We went backstage and what particularly interested me was that the flames were produced from dandelion puffs. They were put in a box connected to a blower and then blown out past a spark-making apparatus.

THEODORE STEINWAY
Steinway & Sons
Long Island City, New York

Dear Sir: I am grateful to William J. Breisky for "My dandelions . . ." and to SMITHSONIAN for publishing it. I wish that something like this had come my way some 20 years ago when I established the Society for the Advancement of the Dandelion (SAD), of which I remain the only official member.

At that time I was campaigning for adoption of the dandelion as the official flower of the United States.

As part of this campaign, former Congressman Carroll Kearns inserted into the *Congressional Record* my tribute to the dandelion as typifying the finest attributes of the American people: initiative, courage, democracy, faith, and the ability to triumph over all enemies—human, inhuman and nonhuman.

In a second campaign, I argued fruitlessly against the overwhelming sentiment of my neighbors. I pointed out that my lawn was the only one in the area where their children were not forbidden to pick the flowers, but they tore up my lawn in the dead of night and made my wife's life miserable during my working hours. Eventually I sold out, comforted only by the knowledge that, while I could be defeated, my dandelions would not be.

Unlike Mr. Breisky, I have no taste for dandelion greens, soup, wine or coffee. My admiration was aroused solely by its more celestial attributes—its simple beauty, its tenacity in the face of every kind of adversity, its faith in the eventual triumph of good over evil.

I suspect that SMITHSONIAN has, by publishing Mr. Breisky's piece, made itself a target for my erstwhile neighbors and

their ilk. I wanted you to know that at least one subscriber is grateful.

MEL WHITE

Bethesda, Maryland

No anti-dandelion mail yet. Ed.

Dear Sir: Our favorites are young dandelion leaves on potato salad. We need more knowledge of edible wild plants.

DR. IDA BOBULA

Gaffney, South Carolina

Dear Sir: The article on dandelions was delightful but I wonder if you have ever noticed that the leaves on each plant are duplicates of one another but that each plant has its own leaf design. I have never found two plants with identical leaf pattern. Perhaps in your illustration the artist used several plants to get the variety of leaf designs that are shown on this single plant.

MRS. HUGH M. FLYNN

Ridgewood, New Jersey

Artist Cushman also noticed the same variety and decided to add one rounded leaf from a separate plant in his drawing. Ed.

Dear Sir: William J. Breisky's paean to the dandelion has led me to rhapsodize further in *Lines To Be Sung To the Tune Of A Lawn Mower:*

With pleasure [my heart] would overflow
If man and woman, lad and lass,
In mowing lawns would henceforth mow
Around these sunflowers in the grass.

A. S. FLAUMENHAFT

Far Rockaway, New York

Dear Sir: Although the dandelion may have been one of the bitter herbs eaten by the ancient Israelites during the Passover festival, its purpose and symbolism were not to purge themselves of wickedness. As noted in the Passover Haggada (the book which contains the story and service of the Passover festival), the answer to the second of the famous four questions is: "We partake of the Moror [bitter herbs] on this night that we might taste of some bitterness, to remind ourselves how bitter is the lot of one caught in the grip of slavery." The slavery refers to that of the Jewish people under the Pharaoh.

SAUL I. GASS

Potomac, Maryland

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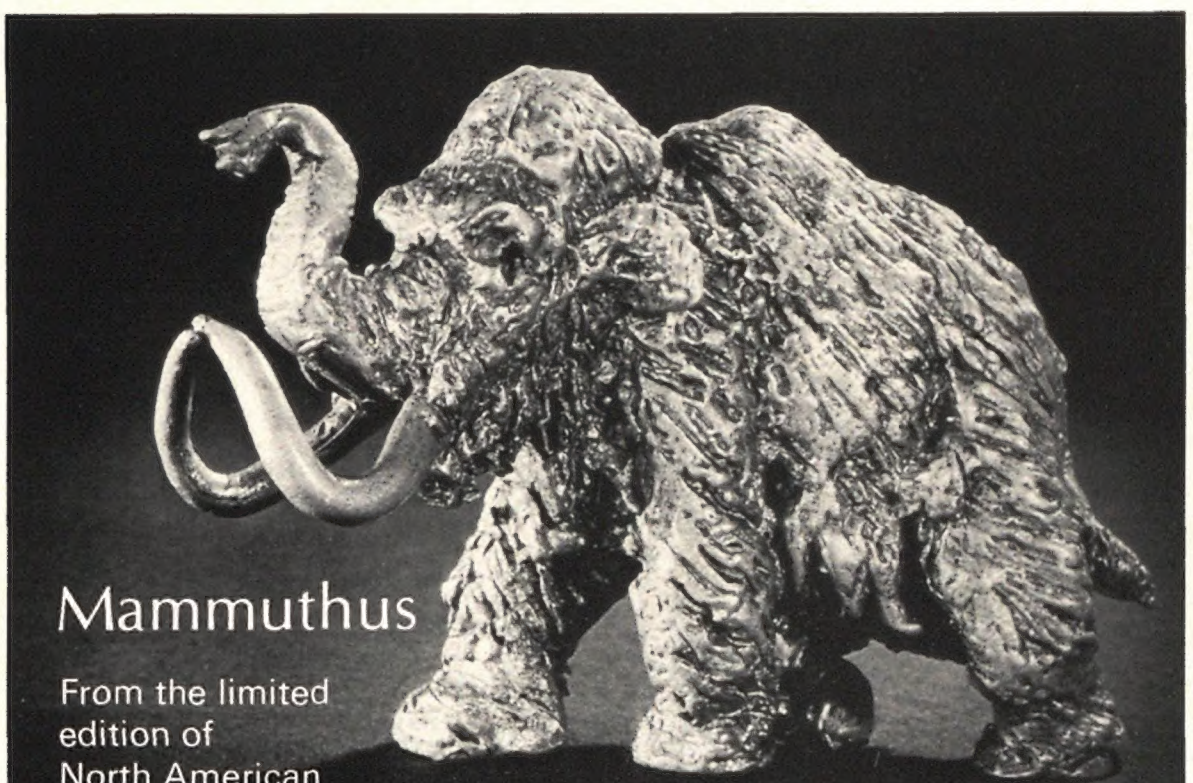

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By Clemency Coggins

The Maya scandal: how thieves strip sites of past cultures

Many U.S. collectors and museums are partly to blame for helping reward illegal exporters of broken artifacts

Not long ago, vigilant law enforcement men captured a group of peasants who had stolen a valuable chunk of Maya Indian sculpture from its wilderness site, and were carrying it away on the back of an old mule. Men such as these who make a living by plundering ancient artifacts are known in Latin America as *huaqueros* or "grave robbers." The mule in question was named "Arqueologo" which indicates that the animal was a veteran of many a similar clandestine operation.

These particular Mexicans were small-time operators in what has recently become a big-time business: the theft of artifacts throughout a vast region extends as far as Peru, with the most serious plundering taking place in Mexico and Guatemala. By aircraft, helicopter, boat and truck, the native stone remnants of the Maya civilization are taken from their natural habitats and eventually sold, often as not, to museums in the United States.

The traffic in Maya art objects is resulting in the destruction of a considerable portion of the cultural heritage of the western hemisphere, for, among other things, the thieves invariably deface, mutilate or shatter major architectural monuments, sculptures and frescoes in the process of hacking them down to size

The author, a member of the Panel on the International Movement of National Art Treasures, specializes in the field of pre-Columbian art and archaeology.

In Dos Pilas, Guatemala, "grave robbers" sawed and defaced this stone stela which was later raised by archaeologists.

A 1958 photograph reveals fragmented stelae left at the site of Tikal, Guatemala. See later photograph below.

Archaeologist William R. Coe catalogues round stone altar when University of Pennsylvania began its restoration of the site.

Thieves imperil a culture

When art smugglers "thin" heavy stelae such as this one, dated A.D. 435, the work of scholars is badly hampered.

for removal and shipment abroad. This plunder has been financed by the international art market, by collectors and by most museums.

At the height of their glory between A.D. 300 and 900, the Maya constructed religious ceremonial centers of great beauty, consisting of pyramids, palaces, archways and huge stone shafts, known as stelae, on which they carved hieroglyphics and exquisite representations of their gods, priests and rulers. Theirs, too, was a civilization marked by advances in the study of astronomy and the development of a calendar.

The haphazard removal of these art objects from their native lands by ignorant thieves has severely hampered scholars. In the last century, as we all know, archaeologists have developed ingenious techniques for interpreting the history of man through the excavation of his buried past. They can sometimes date a tomb or a building, and thus an entire civilization, from the most ephemeral imprint of a vanished textile, the location of bone and pottery fragments and even the traces of a fire that burned centuries before.

Looted objects remain beautiful but dumb

Without these scientific techniques, excavation becomes simply digging or, more simply, looting. An art object which has been excavated by *huaqueros* can rarely be traced to its place of origin even by experts. With no clear historical significance, therefore, the object can only be, forevermore, beautiful but dumb.

During the last 15 years, the number of archaeological sites around the world which have been systematically pillaged and destroyed has increased enormously. Industrialized western nations acquire most of these archaeological works of art. Art objects have flowed into these countries since the Renaissance, when the art of classical antiquity first became desirable and marble statuary from Italy filled the great houses of England and France.

In the 20th century our tastes have become more eclectic. Today there is a market for the artifacts of just about any past civilization, no matter how primitive. For the collector, the art object symbolizes his wealth and material success. For the native who digs up and sells a small portion of his national heritage, the object generally represents money with which to buy food.

The laws of the art thief's country are apt to be so restrictive that immediate disposal of the object to the highest bidder is his only realistic course of action. The dealer who buys the thief's objects and smuggles them out of the country, often believes that his role has been a constructive one, in that he is bringing the object into the light, so to speak, where it can be seen and admired.

Lost for eternity are the beautiful paintings which were ruthlessly scraped from walls of pre-Columbian structure in Yucatán, Mexico.

The dealer may well have a more educated appreciation of the ancient culture than does the digger, but most of the time, his understanding is limited to an appreciation of the object's market value. In my opinion, the dealer has, by his actions, cheated the country of origin, the man who sold him the work of art, the man who will buy it from him—and our entire civilization. The dealer has tempted the digger to destroy a part of his own past in order to offer what may be a beautiful, but relatively meaningless, possession to a foreign buyer. It is not only the Maya areas which have been despoiled; such plundering is also very serious in the Mediterranean and Near Eastern lands which nurtured classical western civilization. It is not putting too fine a point on it to say that the market for pre-Columbian art in Latin America has resulted in the ravaging of Guatemala and Mexico in a manner equalled only by the 16th-century Spaniards in their lust for gold.

As the traffic in Latin American antiquities swells in volume, it becomes more organized. Nowadays, an art dealer in Miami, say, may employ hundreds of *huaqueros* in the wilds of the Yucatán peninsula in Mexico. A Manhattan dealer, upon hearing that a lovely pyramid has been discovered in the jungle of the peninsula's remote Quintana Roo, will seemingly go to any lengths to reach the prize. The dealer orders a road built through the jungle and sends an adviser to help cut the monuments into pieces so that they can be smuggled out. Such an adviser may direct the removal of a fresco and, because he knows little about such treasures, cause it to be ruined. Today, there are only two or three complete Maya frescoes in existence.

Gangs of *huaqueros* have devastated sites in Campeche (Mexico), dismantling intricate cut-stone facades of temples, and leaving religious ceremonial sites pockmarked with pits which archaeologist E. Wyllys Andrews of Tulane University has likened to a "lunar landscape." Along the largely unguarded borders between Guatemala and Mexico, the site robbers enjoy excellent pickings, and once safely back in their own country, they are immune to punishment.

Many of the greatest Maya population centers were located along the Usumacinta River which forms part of the border between the two countries. One of these centers, Piedras Negras, is particularly famous because it was excavated by an expedition from the University of Pennsylvania which published its findings. Piedras Negras is a Guatemalan national monument, isolated by the raging rapids of the Usumacinta River. Even so, the thieves have been there too. They have cut up, for shipment down river, an untold number of stelae which are finding their way into American museums. One of the most notable stelae from the site—of singular historical importance and exceptional beauty—has been brutally disfigured: All of the inscriptions have been hacked off, along with three figures on its sides, and the sculptured niche which framed a seated figure. What is left of this stela may now be seen in the Houston Museum of Fine Arts.

Few Maya sites have escaped the thieves whose methods, in most cases, are crude. Most often they cut up stelae, lintels and wall panels with power saws. First, the sculptures, which are almost always in relief,

are "thinned." Since a stela may weigh several tons, its back and sides are often sliced off in order to lighten it, leaving only the sculptured figures. The robbers generally cut these figural parts into neat squares in order to make them easier to transport. This squaring process invariably sacrifices most of the inscriptions carved on the sides of the stelae.

Maya hieroglyphics are only partly understood, and every single inscription, every single glyph, is needed to decipher them. In and of themselves, these inscriptions are extraordinarily beautiful works of art. But looters leave only chips and fragments of stone at a site that they have worked over.

Some robbers drill holes; others heat the stone and then crack it open with cold water. Still others simply apply sledge hammers. The cruder methods do have the advantage of leaving natural-looking breaks.

Recently, for example, thieves plundered the entire site of Naranjo, Guatemala. We know what happened to some of the Naranjo stelae. A number of the stone shafts were shattered in the drilling and sawing process and now lie in partial ruin at the site. A number of smashed stelae were recovered when authorities caught thieves moving them down river to Belize in British Honduras. The returned fragments now lie in pathetic disarray in the basement of the Museo Nacional in Guatemala City.

Another broken stela from Naranjo turned up in a Houston warehouse in a crate marked "machinery," and the Guatemalan government sued for its return. Furthermore, the government has refused to accept a settlement that would have allowed the importer, in exchange, to keep other objects from Guatemala.

The City Art Museum of St. Louis owns another Naranjo stela. More stelae are doubtless still in the hands of dealers and collectors.

Frescoes from the Mexican National Monument of Teotihuacán, ceramic friezes from the State of Oaxaca, or pottery figurines from Veracruz may be slipped out of the country of origin by truck under loads of manure or farm produce.

Why does a reputable American museum become involved in the acquisition of stolen, mutilated objects? For one thing it is not illegal in the United States to buy these objects, once they are outside their country of origin. It is the dealer who engages in the illegal activity, and he usually sanitizes the transaction by skillfully convincing his buyer that it is a great privilege to buy this object and thus save it for mankind.

A number of collectors and museums buy in good faith, not realizing that they have bought a piece of another country's designated national monument, as must have been the case when the Brooklyn Museum bought part of an inscription from Piedras Negras. Other museums have taken different approaches to the problem. The Minneapolis Institute of Arts, which has a well-known stela from Piedras Negras, radically "thinned," leaves the stela's origin uncertain in its published description. The Museum of Primitive Art in New York has finally, after years of pressure from the government of Guatemala and from scholars in the field, decided to return its Piedras Negras stela.

But more serious, and more ambiguous, is the acqui-

Maya ruins in Mexico and Guatemala.

sition of important monuments from sites which are unknown. Some institutions, such as the Cleveland Museum of Art, buy only the most exquisite objects, but a high percentage of these are of unknown provenance. Such a museum's collections are full of ancient art of extraordinary beauty about which one can say very little beyond accolades and speculations about their origin. Such a museum believes that its highest obligation is to the acquisition of beauty. In order to possess a beautiful object, museums are often willing to ignore its cultural significance.

Many of the largest American art museums were founded more than 50 years ago with wide-ranging art collections which were acquired for the instruction, and the pleasure, of the populace. The museum charters are full of declarations of educational intent, and, with varying degrees of success, most American museums concern themselves with the education of their visitors. This educational preoccupation is uniquely American, and quite unlike European practice where museums have traditionally been considered more the province of the connoisseur, the scholar and the artist. Most European museums, frequently the metamorphosed collections of royalty, are operated by the state. American museums, on the other hand, contain the collections of merchant princes and often depend largely on private support.

European museums did not develop with the express intention of representing all the art of all the world, as did many American museums which conceived of such diversity as the expression of their educational principles. These principles led to the creation of encyclopedic collections with no theoretical boundaries to their extent. American museums, with an infusion of money never available to those in Europe, have become omnivorous.

In my opinion, the voracious acquisition policies of most American museums have perverted their founding principles.

The American scholar who is interested in the historical, as well as the aesthetic, importance of a work of art has increasingly had to share influence with the connoisseur who cares exclusively for its beauty. Much of the hierarchy of the museum is now devoted to the cultivation of potential donors of beautiful objects.

Early museum directors were not scholars

This turning away from scholarly concerns was perhaps inevitable since the early directors and trustees of many American museums were not scholars. The first paid director of the Metropolitan Museum, for example, was General Louis Palma di Cesnola, a professional Italian soldier whose contributions to the Union cause in the Civil War were rewarded by President Lincoln with the post of Consul at Larnaca, Cyprus.

For more than a decade Cesnola plundered the island's archaeological treasures, destroying scores of sites, tricking and defying Turkish authorities, and leaving only a self-glorifying and highly inaccurate account of his progress. Cesnola's vast "collection" was bought by the Metropolitan, of which he was to become director.

The next director of the Metropolitan was J. Pierpont Morgan, who supported expeditions and scholarly research but remained primarily a business man.

Practical men such as J. P. Morgan undoubtedly account for the fact that American museums are so big and so beautiful: Without them, few museums could survive today. But is their basic, characteristically American, philosophy of limitless expansion realistic or desirable? Many of these museums are sinking under the weight of their vast size. As long as American museums are committed to a limitless consumption of the world's artistic patrimony, they may be instrumental in their own collapse.

One forgotten, or perhaps unknown, factor in the open-end acquisition policies of many museums is the relationship which frequently exists between curators and art dealers. Both occupations are based on a love of the work of art, and in both one finds a fascination with the cloak-and-dagger world of the art market. An art dealer need never reveal his sources and he will often go to extraordinary lengths to conceal them. Secrecy and questions of extra-legality are certainly most acute in the traffic in antiquities, but they exist to some extent in all areas of art acquisitions. A curator may have gentleman's agreements with any number of art dealers for a mutual exchange of information and for reciprocal silence. The drama of such maneuvers is fascinating enough to attract some people into museum work, and addictive enough to keep them there. The problem is that these relationships inevitably affect museum policy.

A number of art dealers are scholars in their own fields, and they publish learned and beautiful books which are of value to other scholars. Recently, an enormous compendium of outstanding examples of pre-Columbian art was published with scholarly commentary by an expert in the field. Almost all of the nearly 600 objects in the book's beautiful illustrations had been imported by a well-known Los Angeles dealer. As a sad consequence, most of those objects were reproduced without mentioning place of origin. Since they had been exported illegally, they could have little archaeological or historical context. They are now in private collections and museums in this country and abroad.

Thieves imperil a culture

Museums often justify their acquisition of an illegally exported art object by saying: "If we do not buy it someone else will." There is generally the further observation that the object has, in any case, already been exported so there is nothing to be gained by not buying it. Omitted from this reasoning is a consideration of what may be *lost* by buying it.

Increasingly, the reputations of respected museums are being tarnished by acquisition policies; increasingly, scholars are being barred from working in foreign countries because of the irresponsibility of a few museums; and, most important, the destruction caused by the increasing traffic in antiquities is engendered by the willingness of major museums to buy and accept stolen antiquities.

Some museums assert that they have in fact *saved* the object from rotting in the jungle where no one was appreciating it. In the case of the Maya stelae, there is no known piece of relief sculpture which has reached the market in its natural, jungle condition. The stelae have all been mutilated. At the point of receipt our modern museums patch up the object which they have bought, in pieces, for the purpose of preservation.

Another reason that museums give for accepting such objects from donors is the fear of alienating a source of gifts. While acquisition policies should be flexible, surely there could be some sort of absolute standard which even the wealthiest of donors should be expected to respect. Surely, if a museum let it be known that it would not accept stolen art, donors would not *buy* since, for one thing, they would lose the right to a tax deduction received as the result of the donation.

Another rationale for adding still more antiquities to our museum collections is that we are a "melting pot" country and so have an obligation to buy up all the art of the world for the benefit of our citizens. This is, in part, a latter-day rationalization. Another argument recently put forward by several museum directors is that the United States is "art poor." This argument is unsupported by facts. The United States boasts more art museums than any other country in the world, most of them with pretensions to all-encompassing collections. This country has some of the world's biggest museums and—in the Metropolitan Museum of Art—the world's most varied and complete single museum.

Some controls to prohibit smuggling

Finally, in a last-ditch argument against any sort of control of the acquisition of illegally exported objects, some authorities maintain that dealers will simply forge all their provenances if controls are imposed, hence things will get *worse* rather than better. Dealers in this country are still operating legally in selling to Americans antiquities that have been stolen in other countries. If dealers became involved in the large-scale falsification of papers, they would no longer be operating legally. It is hard to believe that very

Repairing the damage: U.S. archaeologists work on restoration of so-called "Red Stela" found in fragments beneath a temple in Tikal.

many reputable dealers would turn to such activities.

In the last year some constructive work has been done to control the illegal trade in antiquities, and to try to control the depredations themselves. In 1969 the American Society of International Law set up a panel on the International Movement of National Art Treasures in response to a request from the Department of State, which was receiving pressure from Mexico and Guatemala to act on the problem of archaeological theft. The principal result of the panel's work was a proposal for U.S. legislation to empower the Executive branch of the government to prohibit the importation of those significant archaeological and artistic objects which would be designated by a panel of experts as an essential part of the national heritage of their country of origin.

Another particularly fruitful effort of the panel involved its consultative work with the Department of State on a UNESCO Draft Convention dealing with the illicit traffic in cultural property. This month, all of the 125 members countries at the UNESCO General Conference will be asked to vote on the international convention to control art smuggling.

After restoration, the Red Stela shown above reflects the fine craftsmanship of a people who worked with only the crudest of implements.

Yet another result of the consultative work of the panel with the Department of State was the creation of a bilateral treaty with Mexico which calls for the recovery and return of stolen works of art of special historical importance, which are removed from Mexico and enter the United States after the treaty goes into effect.

A final outcome of the work of this panel, conceived and directed by its chairman, Washington lawyer William D. Rogers, has been the creation of a Mayan Rescue Project which, with the generous help of a number of American donors, is planning to salvage that important sculpture which remains at the principal unprotected Maya sites. This rescue operation will work in conjunction with Ian Graham, the English Maya expert, who has been working on a *Corpus of Mayan Hieroglyphic Inscriptions*. Graham's work takes him to sites in the remote jungles of Petén province, Guatemala, and he knows the most about the true extent of the damage.

Beyond the work of the panel there has been an encouraging response to a new awareness of the gravity of the problem. There has been considerable recent press coverage and a few museums have responded to the need for corrective action. The University Museum of the University of Pennsylvania recently issued a statement announcing that it will no longer buy or accept art objects or antiquities which do not have a pedigree or record of their provenance. A similar statement is being proposed by Harvard University which applies to the acquisitions of the Fogg Art Museum as well as to the Peabody Museum, which houses Harvard's ethnological and archaeological collections. Few other art museums have been willing to make such a commitment, although the Metropolitan Museum has recently been instrumental in returning to Mexico an enormous stucco panel torn from the side of a pyramid in Quintana Roo on the Yucatán peninsula (see cover). The panel had been offered to the museum for $500,000.

Tax deductions could be disallowed

Museums which have archaeological collections of a more scientific character have traditionally set a better example in returning plundered antiquities than have museums of art. The Peabody Museum at Harvard has in the past returned to Mexico some of the gold dredged from the cenote, or sacred well, at Chichén Itzá and is now planning to return jade from the same source. The Smithsonian Institution long ago returned to Mexico an important relief from Palenque. And at least one art museum, the Museum of Primitive Art in New York, soon to be part of the collections of the Metropolitan Museum, has pledged

to return its Piedras Negras stela to Guatemala.

All of these resolves and actions should help, but it is unlikely that there will be a significant diminution in the traffic until all art museums resolve not to buy. A number of professional organizations have passed resolutions urging action on this problem but to little avail. More radical measures are, however, envisioned. It has been suggested that the Internal Revenue Service should refuse to grant a tax deduction on an object which has been stolen from another country. Indeed, it seems evident that the American taxpayer should not be subsidizing this commerce. It has been suggested that one of the professional archaeological associations institute taxpayer suits against the public museums which have betrayed their public trust through long-term policies of unethical acquisitions. It is believed that there are good legal grounds for such action. There is increasing pressure on museums. What can they do?

In order to avoid governmental regulations, museums must act to police themselves. Museums must adopt policies which will provide complete, honest, and potentially public pedigrees for all their acquisitions. If museums were to place as much emphasis on scholarship as they do on connoisseurship, there would be less temptation to buy objects without provenance. Scholars are more apt to have some sense of moral obligation to their own field of study.

Conversely, museums should buy only in those fields in which they have curatorial judgment competent to evaluate the cultural significance of a purchase to the whole field of art and history which it represents. Museums must re-examine their open-end acquisition policies and formulate some theoretical extent to their various collections in terms of the educational policies of the institution, and of the function of a museum. Specialized collections are generally of higher quality and of greater artistic and historic importance than are superficial collections; and they usually have greater integrity.

Finally, museums would clearly find it easier to resist the temptations of buying beautiful objects which they know to have been stolen, if they were to adopt a code of ethics which would regulate their relationships with art dealers.

We can work to encourage archaeologically rich countries to sell some of their countless duplicates, as Egypt is doing, and to exchange them with the duplicates in American museums.

Museums are national resources in every country which serve to educate man to his own past, and to preserve that past for him. Unless it is possible to control the plunder and smuggling of our global artistic and archaeological heritage, only chips and fragments will remain to tell the story.

At right, sunrise strikes a glorious Maya temple thrusting from the jungle at ancient Tikal, with stelae propped up in foreground. The same temple, above, after its restoration in 1969.

C. G. Abbot
SUN'S
VARIATION
AND
WEATHER

By Tom Harney

Dr. Abbot: the wizard in the Smithsonian tower

After three-quarters of a century devoted to science and the Institution, he is still busy with his theories and inventions

Dr. Charles Greeley Abbot last June marked his 75th year with the Smithsonian Institution. Still busy with his astrophysical researches, he recently applied for his latest patent, a means of using the sun's radiation to provide a cheap and nonpolluting source of power. He has high hopes for the device, and anticipates that it will operate efficiently even longer than its inventor has. Dr. Abbot is 98 years old.

It might be said that he has had three careers at the Smithsonian: first, as a young man who revolutionized the field of astrophysics early in this century with his brilliant experiments and inventions; second, as fifth Secretary of the Institution from 1928 through 1944; and third, as Secretary Emeritus and white-haired sage dedicated to perfecting a system of long-term weather forecasting based on solar cycles.

When he became Secretary of the Institution, he found the collections threatening to fill every inch of the old "Castle" building's four main floors. He solved part of the space problem by clearing the owls and pigeons out of the tallest of the building's many towers and establishing himself in their place. The office in the tower is part of the Abbot legend. Generations of distinguished scientists and journalists have made their way up its scary heights to see him. Only one mishap is on record. A co-worker of Dr. Abbot once fell through a tower trapdoor and fractured her back. But, as he tells it, it was one of those lucky accidents: The lady married her surgeon.

Dr. Abbot still comes to the Smithsonian once or twice a month, but renovations begun on the Castle two years ago have forced him to move down from his tower. Nowadays, he does most of his work at his home in University Park, Maryland.

It is a source of disappointment to Dr. Abbot that most meteorologists do not accept his theory that the world's weather is correlated with cyclical variations in the sun's energy output. He is convinced, however, that the day will come when they will no longer dispute it. He will unroll for a visitor a portion of his evidence, which he keeps wrapped around a Quaker Oats box. It is an 18-foot scroll of paper that stretches from one end of his living-room rug to the other. On it are tens of thousands of closely spaced handwritten figures recording the monthly precipitation of St. Louis for 104 years, from 1854 through 1957.

Zigzagging the length of the chart are a red line and a blue line, one showing Dr. Abbot's predictions and the other recording what really happened. Dr. Abbot says that his predictions are satisfactory from 50 to 70 percent of the time. That's about as good an average as can be claimed in 24-hour weather forecasting.

Dr. Abbot's system is based on the discovery that the sun is not a perfectly constant star. Rather, it varies during a period of 273 months. Within the 273-month period there are subcycles, "harmonics" of the basic cycle, expressed as fractions of the whole. The 273-month period repeats itself, as do the rainfall and temperature patterns that fall within the cycle and its subcycles.

Given sufficient data on an area for a sequence of about 1,000 months, Dr. Abbot can sit down and in a

Dr. Abbot with the book that embodies his theories about the weather: a portrait by Yoichi Okamoto.

The wizard in the tower

few hours come up with a forecast for any day of the year that you want. He likes to boast that in one year he was consulted by 14 brides-to-be anxious about the weather on their wedding days. He predicted fair weather for 13 of them, and the sun shone on all. He told the 14th that it looked doubtful, but she stuck with the date and it turned out cloudy.

Dr. Abbot's second great interest in the last few decades has been finding a feasible method to tap the sun's energy. He started conducting experiments along these lines more than half a century ago. In 1920 he built a solar cooker at Mount Wilson Observatory in California, where he often went during the summer. Mrs. Abbot used it for years to bake bread for Smithsonian scientists.

He has since invented and patented more than half a dozen devices to collect the sun's rays for useful purposes. His latest patent, granted in 1968, was for a device using "unlimited power from sun's radiation." He readily admits that it has one shortcoming: It cannot be operated as cheaply as commercial oil or coal power generators. But he believes that he has finally licked this problem in his newest design, the one which he submitted to the U.S. Patent Office last summer; it is still pending.

"Often the most brilliant ideas and solutions," he wrote in his autobiographical book *Adventures in the World of Science,* "come like surprises when we awake at three o'clock in the morning." At least one of his patent ideas, he says, came in exactly that manner.

Dr. Abbot's inventions have by no means been limited to the field of solar radiation. During his long career he has invented mechanisms that range from a variable-speed transmission gearing to an 1896 automatic camera system for taking sequential pictures of turkey buzzards. He recalls that he was interested in things mechanical as a boy on a farm in Wilton, New Hampshire, long before he developed an interest in solar radiation. "At that time I did not care much about the sun," he says. "I always hoped it would rain so I could stay inside in our shop rather than having to go out and plant corn."

After two years in the Wilton high school and a year on the farm, he had a chance to attend Phillips Academy in Andover, Massachusetts. There, in the spring of 1890, a group of his friends were planning to go to Boston to take the entrance examination for the Massachusetts Institute of Technology. Since he had never seen Boston, although it was only 55 miles from home, he decided to go along. When the time came for the other boys to go off to their examination, he suddenly felt nervous about being alone in "the great crooked-street city." So, to pass the time until they were free, he tagged along and took the examination too. He passed it "without condition." And thus began this long and immensely distinguished career in science.

A visitation from Secretary Langley

He took a degree in physics at M.I.T. and went into graduate work there. In 1895 Samuel Pierpont Langley, third Secretary of the Smithsonian, stopped by to look for an assistant for the Institution's Astrophysical Observatory. A professor recommended Abbot.

He was in the laboratory when he was told that Secretary Langley wanted to see him. In his dirty, acid-holed coveralls he hastened out to meet "a stout gentleman with a silk hat and a shortly cropped beard."

"How do you do?" said Abbot. "Wouldn't you like to see my experiment?"

"I would like it extremely," replied Langley, "but I regret that my engagements will not permit."

He looked Abbot up and down for a minute or so, and turned on his heel. The next day Abbot, who was then 23, received a telegram offering him a job at $1,200 a year. He left for Washington on the first train.

In his early years at the Astrophysical Observatory, Dr. Abbot made use of his mechanical skills to perfect existing astronomical instruments or to invent new ones, many of which have never been improved upon and are still in use throughout the world.

In 1902 he and Langley began their work on measuring the intensity of radiation of the sun. It was while making these observations—which continued until 1952—that Abbot first noticed a relationship between solar variation and the earth's weather. Secretary Langley died in 1906, and his successor—Charles Doc little Walcott—made Abbot Director of the Astrophysical Observatory, a title he held until 1944.

Langley, at the time he hired Abbot, was not only the country's leading investigator of solar radiation

but was already beginning to look into the possibilities of mechanical flight in heavier-than-air machines. Dr. Abbot remembers climbing to the roof of the Smithsonian tower, carrying a four-inch telescope, to watch Langley's historic attempt to launch an airplane ("aerodrome," he called it) off a houseboat in the Potomac. "I saw the craft go off the houseboat," he recalls, "nose sharply upward, and wheel backward into the water after the front wings collapsed." The failure might not have been so disappointing to Langley if news had not come ten days later of the success of the Wright Brothers' flight at Kitty Hawk.

Dr. Abbot later had a hand in the development of a far more radical kind of flight. He encouraged the research of Professor Robert H. Goddard, who later invented and fired the first liquid-fueled rocket, at a time when no one else took him seriously.

In 1915 Goddard sent a paper to the Smithsonian that Dr. Abbot read and thought was the best presentation of a research project he had ever seen. Goddard got a $5,000 grant. After the U.S. entry into World War I, a tactless Signal Corps officer went to Goddard's laboratory in Worcester, Massachusetts, and demanded that he turn his rocket research over to the Army. Believing that he would make better progress on his own, Goddard refused.

"We are going to take it over! You can just put that in your pipe and smoke it," the officer told him.

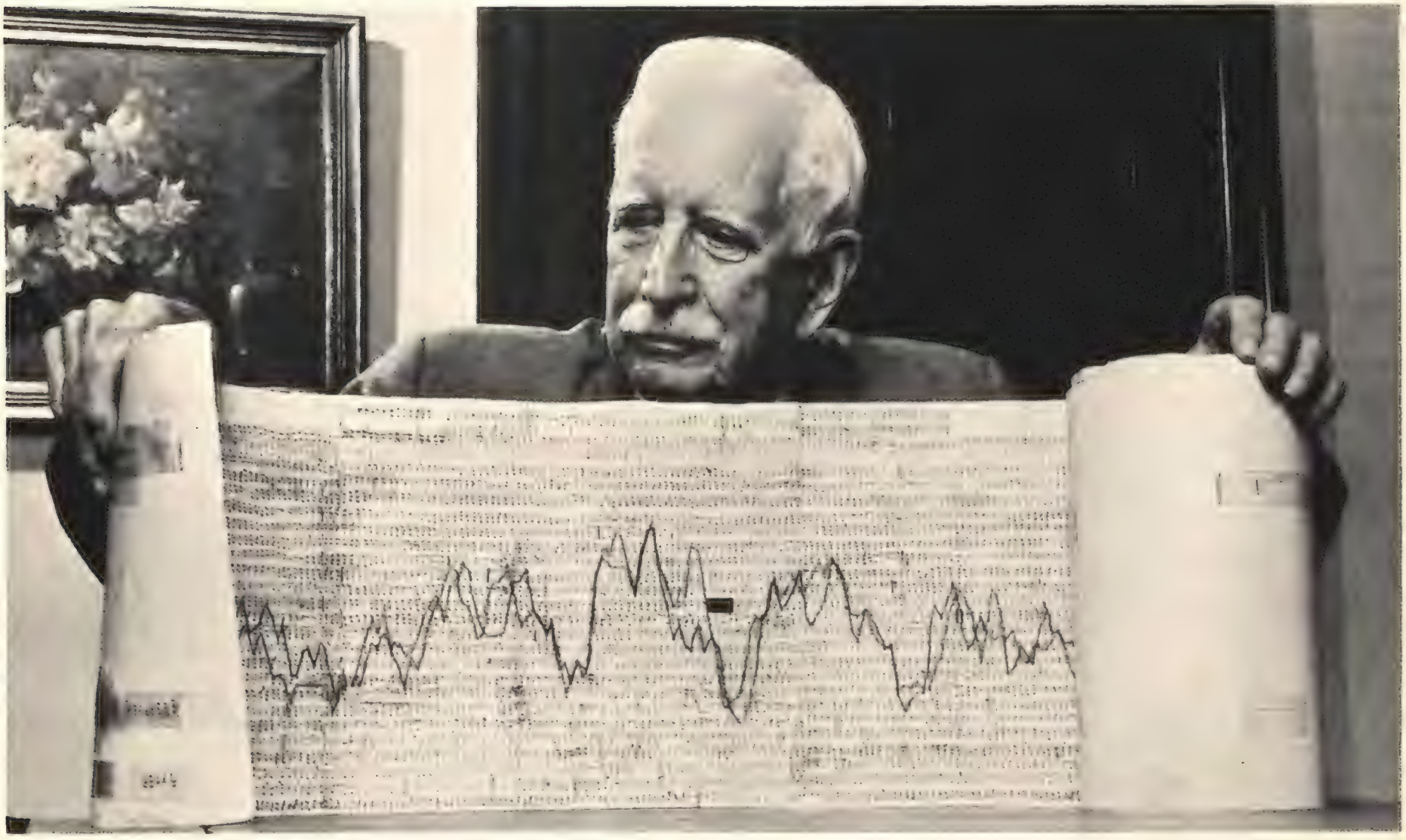
"I don't smoke," replied Goddard. He went to Washington to see Dr. Abbot, who made arrangements for him to move to a laboratory at Mount Wilson. Goddard immediately returned to Worcester, packed everything, was driven in the night to a railway station and disappeared.

Once Goddard was safely in California, the Smithsonian exerted its influence to get the Signal Corps to give him a grant—for independent research. In November, 1918 Goddard demonstrated his new rockets to the Army—three days later the Armistice was signed.

Over the years, Dr. Abbot's solar observations have taken him to every continent but Antarctica, and to many remote places to see solar eclipses. But when last March a total eclipse was visible along the Eastern Seaboard for the first time since 1900, he did not leave his armchair.

"When you are 98," he explained, "there really isn't much to be seen about an eclipse that you haven't seen before."

Dr. Abbot unrolls a portion of his 18-foot chart recording 104 years of St. Louis precipitation.



New York

The planet gasps: a look at smog

It's difficult to find a silver lining
in the great gray, greasy clouds
which periodically smother large cities

Each year, 800 million tons of man-made pollutants spew into the earth's atmospheric envelope so that eye-stinging, suffocating, odious, sooty smog has become a global problem. Manhattan office workers, Tokyo schoolchildren, and even residents of Sydney, Australia crowd hospitals with eye and respiratory complaints. Trees wither and die in Saigon and St. Louis. The deserts of northern Arizona, the vast reaches of the Pacific Ocean, and the great plains of central Asia have also suffered a substantial increase in the turbidity or dustiness of their atmosphere. Of longer-range concern: Meteorologists report that air pollution is changing the world's weather patterns in disturbing ways they do not yet fully understand.

Montreal

Sydney

By Andrew Oliver

J.Q. Adams was the nation's most indefatigable sitter

It is known that Adams sat for his portrait more than 60 times—less out of vanity than a sense of history

Peter A. Juley & Son

Adams at 16: his first portrait, drawn at The Hague in 1783 by Isaak Schmidt. This is a photograph of the original, which has since dropped from sight.

[In November the National Portrait Gallery in Washington will open an exhibition of "The Life Portraits of John Quincy Adams." This is the Gallery's first exhibition of a type that its director, Marvin Sadik, has been eager to mount: iconographic in nature and dealing with all the life portraits of a given individual. In many ways Adams is an ideal subject: His early battles in the cause of civil rights make him relevant to today; he was the earliest and staunchest friend of the Smithsonian Institution; above all, he is known to have sat for a prodigious number of portraits. Even though, a third of these are now lost or unlocated, there will be more than 40 examples in the show. In these pages SMITHSONIAN presents reproductions of some of the portraits in the exhibition.]

"What would not the modern student of history give," wrote the Reverend Elias Brewster Hillard in 1865, as he gathered together for publication the likenesses of the last seven surviving soldiers of the Revolution, "for the privilege of looking on the faces of the men who fought for Grecian liberty at Marathon, or stood with Leonidas at Thermopylae. . . !" It is with this cry in mind that we contemplate the likenesses, from youth to old age, of one of those who took such an active and vital part in the rise and progress of our Republic to a first position among the nations.

The spring of 1839 furnished, in its way, as characteristic a pattern of the activity of John Quincy Adams as any other period of his life could supply. In addition to the hectic activity normally attendant on the affairs of the Congress, Adams was engaged in preparing an address to be delivered before The New-York Historical Society on the last day of April; the occasion was the 50th anniversary of the inauguration of his early friend and benefactor George Washington as first President of the United States.

"The subject," Adams wrote, "is rugged with insurmountable difficulties. My reputation, my age, my decaying faculties, have all warned me to decline the task. Yet I cannot resist the pressing and repeated invitations of the Society. The day was a real epocha in our history; but to seize, and present in bold relief all

This article will appear in somewhat expanded form as the Introduction to Mr. Oliver's Portraits of John Quincy Adams and His Wife, *© 1970 Massachusetts Historical Society, to be published this month by Harvard University Press in Series IV—* The Adams Papers, *L. H. Butterfield, Editor in Chief.*

This portrait was painted by John Singleton Copley as a surprise for Adams' mother. The year was 1796; JQA was 28 and was shortly to become engaged.

Museum of Fine Arts, Boston
Gift of Mrs. Charles Francis Adams

Courtesy of David M. Freudenthal

Silhouettes of the Adamses cut by Henry Williams in 1809 as they were about to leave for Russia.

U.S. Department of State

Ivory miniature of Adams' bride, perhaps by Samuel Shelley, painted in London in 1796 or 1797.

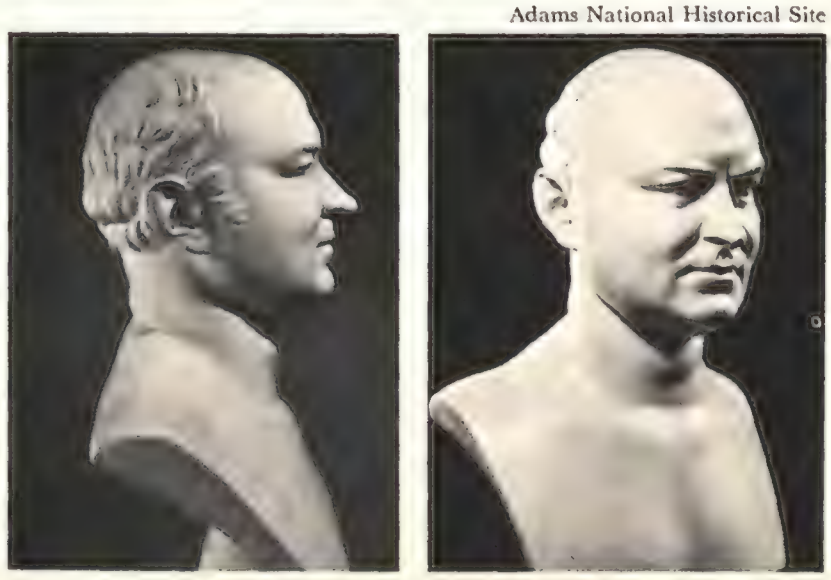
its peculiar characters would require a younger hand and a brighter mind." After ten more days of composition: "I shall have no quiet of mind till it is over, and perhaps then less than ever."

During the whole period in which he was so occupied he was sitting regularly for his portrait for one S. M. Charles, an artist about whom little is known and whose painting is now lost. A brief note in Adams' diary describing the last sitting mentions the fact that he had already had 34 portraits painted during his life. The subject was fresh in his mind, despite other and clearly more pressing concerns. A list of all these portraits, prepared in his own hand on that same day, April 20, 1839, appears, not in the diary itself, but on a paper later bound up in one of his volumes of miscellany, labeled "Rubbish." It was probably compiled in a moment of relaxation between his congressional duties, his sitting to Charles (which no doubt prompted it), and the preparation of the memorial address.

It would be remarkable if a list constructed under such circumstances, and when Adams was 72 years old, were not only complete but accurate. It was neither. It omitted some portraits, it included others that had not been painted, and it contained errors in the date of certain paintings. But it is nevertheless an extraordinary register of the painting of almost three dozen portraits of one man over a period of more than half a century.

In a diary entry several years later, for August 15, 1843, at the time he was sitting for Franklin White (who, as Adams said, "can scarcely claim to be called an artist"), he gives the latest score of his portraits:

Adams National Historical Site



JQA as Secretary of State: two views of a bust by Pietro Cardelli modeled in 1818. Adams was 51.

National Collection of Fine Arts

Louisa Catherine Adams by Charles Bird King, c. 1824.
A relative thought her "overdressed." The song:
"Oh Say Not that Woman's Heart can be Bought."

"This is about the 45th time I have sitten for my pictures, and I question whether another man lives who has been so wofully and so variously bedaubed as I have been. There is no picture of my childhood but from the age of 16, when I was caricatured in crayons by Mr. Schmidt for four ducats, down to this my 77th year, when Mr. White has lampooned me in oil, scarcely a year has passed away, without a crucifixion of my face and form by some painter, engraver or sculptor. A miniature in a bracelet for my mother, painted at the Hague in 1795 by an Englishman named Parker, now in the possession of my son John's widow —Copley's Portrait of 1796—Stuart's head of 1825, and Durand's of 1836 painted for Mr. Luman Reed, are the only ones worthy of being preserved, with the Busts by Persico, Greenough and Powers. The features of my old age are such as I have no wish to have transmitted to the memory of the next age. They are harsh and stern far beyond the true portraiture of the heart; and there is no ray of intellect in them to redeem their repulsive severity."

Despite Adam's protestations to the contrary, the 1839 list confirms his genuine, indeed overriding, interest in preserving, not only for himself and his family but for his country's history, his own likeness—as it was throughout his life, each year of which he knew was significant in the life of that country. It had been the same with his father, continually protesting, yet sitting to every artist, save one, who sought to take his likeness. The son in his turn had seen to it that the great Stuart had painted his father in his 90th year, to preserve for posterity the features of the old patriarch, the friend of Washington, of Jefferson, of Rush; a signer of the Declaration of Independence and one of the central figures attendant at the birth of the Great Republic. This historical sense of the value of a portrait likeness, not only to one's descendants but as a permanent historical record and part of his country's heritage, persisted throughout Adams' life. Nothing else can explain the hundreds of weary hours he gave to the scores of painters who besought them.

And so it was, in a moment of leisure in that busy day in the spring of 1839, that Adams looked back and recalled (and recorded), maybe with a touch of vanity, perhaps with some wistful pride as well as surprise, the many times he had sat for his portrait. First, long ago in Holland, when only 16, he was painted "in his best coat and powdered wig," then at the time of his marriage, later as Envoy, Ambassador, as Secretary of State, as President of the United States, and for almost a decade as Member of Congress from Massachusetts. These likenesses had been taken by the popular portraitists of the day—Copley, Stuart, Charles Willson Peale and his gifted son Rembrandt, Charles R. Leslie, Pietro Cardelli, C. B. King, Chester Harding, Sully, John H. I. Browere, Greenough, Powers, and Asher Brown Durand—names that fill the pages of the history of portraiture in America during the early decades of the 19th century.

At an age already beyond his biblical allotment, how could he know how much still lay ahead of him? Yet to be painted were the great and lasting likenesses of "the Old Man Eloquent," as he had been dubbed in

Courtesy of Mrs. Robert Homans

At 49: portrait by Charles Robert Leslie, 1816. Adams was then Minister to the Court of St. James's.

Courtesy of John B. Ames

At 61: a silhouette of Adams as President cut in the White House by William James Hubard late in 1828.

the House in 1836: those to be done by William Hudson jr., Edward D. Marchant, James Reid Lambdin, George Caleb Bingham, Eastman Johnson, G.P.A. Healy, J. C. King, and, inevitable as inventive ingenuity developed, those by the enterprising, talented followers of Daguerre: Mathew B. Brady of Washington, Albert Sands Southworth of Boston, and a host of other operators. By the time Daguerre's magic black box nudged its way firmly into the field of portraiture, Adams would have sat to artists for more than 60 likenesses, in every decade of his life except the first and third—one in his teens, four in his twenties, three in his forties, 12 in his fifties, 14 in his sixties, and 29 in his last decade.

With but few exceptions Adams had only the most disparaging remarks to make about the portraits of himself, a habit inherited from his father. This can be illustrated by a few of his comments, the artist's name in parentheses following the comment on his work: "As a work of art, it rates too low to have any value elsewhere" (Schmidt); "Indifferent as a work of art" (Van Huffel); "We found that he had totally failed in the likeness" (Cardelli); "He has made a Caricature of my Portrait" (C. W. Peale); "It is *horribly* like" (Clevenger); . . . "A hideous likeness" (Gibert); "All hideous" and "Too true to the original" (daguerreotypes). In 1831 he wrote, "I have grown shy, and reluctant at exposing my infirmities to the men of the Palette and brush." Yet he sat readily to all who asked, often at great personal inconvenience and at the expense of what must have been precious time.

Adams lived in the generation which benefited, or suffered, from the transition from painted portraits to photographs—the transition from a likeness which reflected the viewpoint, and perhaps the philosophy, of the artist to the stark reality of the mechanical, photographic process. And we discover that the portraitists, with whatever imaginative means they used, produced likenesses that not only compared fairly with the photograph but also added the subtle nuances of gentleness or severity that reflected the mood in which they found the sitter at the time.

In 1833 Adams gave to a friend, Christopher Hughes (and to us), a revealing self-characterization:

"A warm heart I once had, and my manners were not then cold, nor had I then been sixty years cribbed in the thrilling regions of thick ribbed ice which encase a heartless world. . . . My manners and my heart grew cold together, because I found that warmheartedness was a waste of good seed in thankless soil; and after less than one half your intercourse with mankind (and womankind) I brought myself to the conclusion that

National Gallery of Art, Andrew Mellon Collection

At 57: the portrait by Thomas Sully was painted in December 1824, when Adams was President-elect.

Justice, and Benevolence, and humanity, and kind-offices, were virtues due from man to man as a rational and responsible being, but that warmheartedness was not of the number—and that Temperance, Prudence and Fortitude selfish and cold hearted as they all are, stand quite upon a level with the others in the class of virtues or moral accomplishments. . . . I did not, for here and there an injustice or a perfidy that I suffered from man or woman, suffer myself to fall into misanthropy—much less into *misoguny* (I suppose you do not know that this barbarous word means woman-hating). I took mankind as you must take your wife, for better for worse, and believed that the secret of dealing with my fellow creatures of my own times, was to keep my heart and my judgment always *cool*. I have not always succeeded . . . ."

With certain notable exceptions, the likenesses of John Quincy Adams that have been preserved are not outstanding as works of art. We can, however, agree with him that in most instances they are "like." Too true to the original he found them, but it is this very fact which gives us the assurance that this extraordinary collection of likenesses does indeed reveal how the man appeared from the age of 16 in 1783 until his death in 1848.

The record would not be complete without recording the known portraits of Adams' wife, Louisa Catherine Johnson, several of which were taken before her marriage. Their number is not large, and they do not have the extraordinary variety and progression shown in the likenesses of her husband; yet they do show the transition from a vivacious young girl, bright and happy, into her middle age, when she appears with a wistful, sad expression—what her son Charles termed "a sorrowful appearance too common to her."

Her youth had been gay and lived in a handsome style in Paris and London before her father's financial reverses. But her years as Adams' wife were fraught with difficulties—surmounted, to be sure, but which took their toll. She suffered in her travels and residence in Berlin and later in Russia. Her temperament and tastes were not at all those of her husband. Yet she played her part and was an accomplished hostess; her parties in Washington were always popular and gay occasions. "Mrs. Adams' Ball" for General Andrew Jackson in January 1824, on the anniversary of the Battle of New Orleans, was a good example and one long remembered. Her great grief of course was the

Museum of Fine Arts, Boston; lent by the City of Boston

At 71: painted by William Page in Boston in 1838. Adams said of it, "It has no pleasant aspect."

U.S. Department of State

At 77: "A hideous likeness" is how Adams described the portrait painted by J.B.A. Gibert in 1844.

tragic death in 1829 of her eldest and favorite son, George Washington Adams (he jumped or fell from a steamer in Long Island Sound shortly after his 28th birthday). She had scarcely recovered from this when she was thrown back again into another score of years of life in Washington during her husband's terms as Representative. She stood with him throughout these years, but with failing health and a desire to return to the ease of retirement. In the end, it was she who was left behind, to survive her husband for four years.

We could have wished for likenesses of Louisa in her later years to match the many fascinating ones of her husband, but none is known. We are nevertheless fortunate to have several pairs of portraits of them, taken at the same time, one before marriage, one when he was Ambassador at the Court of St. James's, one when he was Secretary of State, and silhouettes made during their White House years.

There are two themes that are repeated many times in the J. Q. Adams portraits, repeated so often as to make it clear that they appear at Adams' request and not at the instance of the artist. A book in hand, with a finger between the pages, is not unknown as an artist's prop. But in six of Adams' portraits he appears with a book in hand or on his lap, and in three instances, widely separated in date, he is shown with his finger between the pages of the book. In addition, in many engravings or lithographs of portraits which as painted showed only the head and shoulders of the sitter, the engraver has added a book in hand and in several instances a finger between the pages.

A ready explanation of this theme is found in Adams' great love of books. He was a voracious reader and collector. His taste was catholic. The Bible was a daily staple; the classics, astronomy, poetry and general literature absorbed what time he had free from his professional or social obligations. Numberless are the entries in his diary and the shelves holding the books he gathered over the years, now preserved in the two-storied Stone Library adjoining the Old House in Quincy—all attesting his consuming interest and occupation in reading and collecting. It is not surprising, then, to see him depicted so often as if he had been but momentarily interrupted by the artist and intended shortly to resume his reading.

The other and more significant theme that is repeated in several of the portraits is the device of the Lyre and Eagle seal which Adams adopted and made

National Portrait Gallery

At 77: by George Caleb Bingham, painted about 1850 but probably derived from a life portrait, 1844.

Caisse Nationale des Monuments Historiques, Paris

At 78: G.P.A. Healy, 1845, for King Louis Philippe. Said JQA: "the strongest likeness of me ever painted."

Lyre and eagle, "the Seal of my own device"

both public and private use of. It meant so much to him that it is worthy of more than a passing word. His own explanation of the symbolism of the device is given in his diary entry for September 7, 1816:

"In the Grecian Mythology, Orpheus is said to have charmed Lyons and Tygers, the most ferocious wild Beasts, and to have drawn after him the very trees of the forest and the Rocks of the desart [sic] by the harmony of his Lyre. . . . The meaning of this Allegory is explained by Horace, De Arte Poetica, v. 390. Orpheus was a Legislator whose eloquence charmed the rude and savage men of his age to associate together in the State of civil Society, to submit to the salutary restraints of Law, and to unite together in the worship of their Creator. It was the Lyre of Orpheus that civilized Savage Man. It was only in Harmony that the first political institutions could be founded. After the Death of Orpheus, his Lyre was placed among the Constellations, and there, according to the Astronomics of Manilius, still possesses its original charm, constituting by its concords the Music of the Spheres, and drawing by its attraction the whole orb of Heaven around with its own revolution. It is the Application of this Fable, and of this passage of Manilius, to the United States, the American political Constellation, that forms the device of the Seal."

Adams then quotes the passage from Manilius (*Astronomicon*, i, 332 ff.) with a translation—perhaps his own—and continues:

"The Modern Astronomers have connected a Vulture with the Constellation of the Lyre, and it is marked upon the Charts of Bode's Uranographia by the name of Vultur et Lyra. Instead of that bird, by a slight poetical license, I have assumed the American Eagle as the bearer of the Lyre. . . . The motto from Manilius [*Nunc sidera ducit,* Now it leads the stars] is upon the Lyre itself. The moral application of the emblem is, that the same power of harmony which originally produced the institutions of civil government to regulate the Association of Individual men, now presides in the federal association of the American States."

Some few years later he noted in his diary that he was determined never to use his "seal-at-arms" (meaning the Adams family crest) on any public instrument, heraldic seals being "inconsistent with our republican institutions." He added: "I have substituted in their stead the Seal of my own device—The Constellation of Eagle and Lyra, with the motto from Manilius." The same device was used on U.S. passports, doubtless at his instance, from as early as 1822 to at least 1830. That this device typified Adams' whole public career is evidenced by a passage in his letter to Robert Walsh jr. in 1829, in which he wrote: "The federalism of Washington, Union, and Internal Improvement have been the three hinges upon which my political life and fortunes, good and bad have turned. Upon these I have risen, by these I fall,

'Yet bate I not a jot of heart or hope.' "

Then, after citing various papers and speeches to which his biographer ("if I have one") must go to seek his principles, he adds: ". . . the Seal which you will find upon this letter is a Pythagorean Emblem of my whole political System."

Adams' popularity, if we can use that word, his hold on the affection of some and the admiration of most of the people, increased with age, until at the end he appeared a very monument to faithful, patriotic devotion. About a year before he died, as he entered the House for the first time following a debilitating illness, the Speaker rose to his feet out of respect, and with him the entire membership of the House, friend and foe alike.

Small wonder that people were interested in his likeness. Who else could boast of 63 years of service to his country, who else with such a record could carry on to the bitter end, dying at his post? "The Old Man Eloquent," they called him; they may not all have agreed with his stand on the many issues of the day, but they knew his record for integrity, faith, courage and constancy, and, because of the extraordinary variety and extent of his portraiture, we can now know, as did his contemporaries, what he looked like.

"Old Man Eloquent," a daguerreotype of Adams probably made by Albert Sands Southworth in 1843.

Metropolitan Museum of Art

People under stress, and under water too, in Tektite studies

Aquanauts, male and female, helped to establish criteria for selecting crews for the long space flights that lie ahead

A manned expedition to Mars and back could take as long as 18 months, allowing for a 60-day exploration of the red planet's surface. This is an incredibly long period of time for a small group of individuals, no matter how highly motivated, to live together harmoniously under stress and in close confinement. Should the U.S. political and economic climate change enough in the next few years for abundant funding to become available once more for space exploration, a flight to Mars could lift off in the late 1980s or early 1990s. That such a project will eventually take place, whatever the date, officials of the National Aeronautics and Space Administration (NASA) have no doubt.

Looking toward flights to the planets, and to the long-duration, earth-orbiting flights of Project Skylab a few years hence, NASA is busily gathering all the data it can about the behavior of small groups of people under conditions of stress.

Up to now, American spacecraft crews have been made up of test pilots or pilot-scientists; from now on "passenger" scientists will make up an increasingly large proportion of spacecraft crews.

For these and other reasons, NASA was a principal sponsor of Project Tektite, in which small teams of ocean scientists and engineers took turns living in and working from a habitat rooted 50 feet below the surface of great Lameshur Bay on the island of St. John in the Virgin Islands. The team stayed down for periods of 14, 20, 30 and, in one instance, 60 days. Throughout the aquanauts' time beneath the surface,

The five women scientists in the program swim outside of their habitat, which is in the background. They were down two weeks.

they were kept under 24-hour surveillance, via closed-circuit television, by behavioral scientists and biomedical specialists in a command-and-control van located on a rocky hillside overlooking the bay. The project is scheduled to end next month.

Although it will take many months to analyze data, officials close to the project already consider Tektite a success.

For one thing, dozens of government agencies, foundations, universities and private contractors managed to work together on Project Tektite with a bare minimum of the tensions that such multiagency programs invariably engender.

As expected, personality, cultural and occupational conflicts arose among the aquanauts with the passage of time in the habitat's confined quarters. "To say the least," according to one NASA man, "we are going to have to be very careful in command and crew selection and rotation in long-duration projects."

A scientist-engineer team of five women spent two weeks working from the habitat, demonstrating that carefully selected women—no less than carefully selected men—possess the motivation and emotional stability for such tasks. "They showed us they could do it, no doubt about it," says NASA's program director for Project Tektite, Richard H. Sprince, who predicts that the day is not far off when women will be included as passenger-scientists in mixed spacecraft crews.

The male aquanaut teams shifted away from the diurnal cycles they had observed on the surface, going to sleep later each night and rising later. Because the female team was particularly interested in the study of algae and the effect of light upon it, they operated dawn and dusk patrols that forced them to keep to the diurnal clock. On the seventh night of the two-week experiment, however, the women informed the surface command center that they were not going out on patrol the following morning. Instead, they stayed in bed and woke up on the eighth morning at the same time they would have awakened had they been slipping away from the diurnal clock for seven days.

The aquanauts used a closed-cycle underwater breathing system, called a "rebreather," provided by the General Electric Company and adapted from a similar device worn by the Apollo astronauts on the surface of the moon. Approximately the same weight as a pair of twin-70s scuba gear, the G.E. unit emits no bubbles because exhaled gas is returned to the diver with the unused oxygen after it has passed through a "scrubber" which removes the carbon dioxide. The unit operated successfully during the four-hour limit imposed by the experiment. Also, the absence of bubbles allowed the aquanauts to swim up to and among fishes of many varieties without frightening them away.

A principal mission of Project Tektite was to saturate the body tissues of the aquanauts with a breathing mixture of approximately 92 percent nitrogen and eight percent oxygen throughout their underwater stay, and to establish the limits—believed to be a depth of about 100 feet—of its safe and efficient use. Tentative results indicate that the nitrogen mixture *will* be

Aquanauts shed scuba gear at end of mission and ride this ambient-pressured capsule to surface where they undergo decompression.

suitable for work at depths of 100 feet. The significance for shallow-water application is that nitrogen is far cheaper, and logistically easier, than more exotic mixtures such as those using helium; hence it will open up to exploration great reaches of the continental shelf for research at minimum expense.

The aquanauts report that nearly every experiment they conducted was tremendously enhanced by the ability to work in the sea for hours at a time, day in and day out, and to examine their findings in the habitat laboratory as they went along. Often the aquanauts lay for hours on the sandy bottom, quietly observing the teeming fish life swirling around them. John G. Van Derwalker of the Department of Interior's Bureau of Commercial Fisheries, for example, learned much about the habits of spiny lobsters. "They have an extremely proficient navigational system that enables them to leave a burrow in the late evening, travel as far as 1,000 feet out on the plain, and return to their burrow in the early morning."

How to live in comfort 50 feet down

In and of itself, the five-man-capacity habitat was an important experiment, and a successful one. The habitat consists of two vertical cylinders, just over 18 feet high and 12½ feet in diameter, connected by a tunnel 4½ feet in diameter, and standing upright on a base structure.

The left-hand cylinder contains the crew quarters on the lower deck, with the bridge—or control room—on the upper deck. The right-hand cylinder contains a "wet room" and laboratory in its lower half, and an engine room on its upper deck where the environmental control and electrical power equipment is located, along with a food-storage freezer.

The habitat is relatively luxurious, and thus subject to some criticism, perhaps, although it is this country's tradition to go to war—and into peacetime research—in a certain amount of style when possible. The living quarters boast of wall-to-wall carpeting; the food is excellent and anything but cheap (similar meals were provided the Apollo astronauts in their quarantine van upon return from the moon). The aquanauts' food is being studied for future long-range space flights during which the quality of meals is going to become an increasingly important factor in crew morale. Dozens of musical tape cartridges were provided for the aquanauts, and among the perhaps trivial data to come from the project is the fact that the lady aquanauts leaned more heavily toward serious music than did the males.

The habitat had six plexiglass hemispherical windows, two feet in diameter, which provided a 360-degree view of the surrounding waters and sea floor.

Dr. Mead, a leading ocean scientist, studied algae during daily dawn and dusk patrols. Her parachute-like pack is rebreathing apparatus.

His back loaded with seawater samples, Roger J. Dexter swims to habitat. Circular photos were taken with "fisheye" lens.

In situ sampling of seawater for subsequent oxygen analysis was a major project. Dexter (above) injects fixative with hypodermic needle.

Dexter swims into habitat's entry tunnel past bottles of reserve oxygen. He will then enter wet room laboratory via hatch.

These windows, in fact, work both ways. Fish appeared to enjoy looking in as much as the aquanauts enjoyed looking out. It also includes an observation cupola with 360-degree visibility—a popular place, as it turned out, for crew members to retire to when they experienced an excess of cabin fever and wanted some privacy.

Unfortunately, the name of the project has caused considerable confusion. No one, it seems, has been entirely clear about why it was called "Tektite." The name, which derives from a Greek word meaning "molten," has been applied to small, round, glassy objects found in various parts of the world, including the seabed, and believed to have been created by the passage through the atmosphere of meteorites, asteroids or fragments of comet-tails. Since they have now been found on the moon as well, the name was hit upon by scientists straining to find a word that suggested a link between inner and outer space.

Everything but beards

The female aquanauts added a welcome splash of glamor to the project. They were led by Dr. Sylvia Mead, mother of three and the wife of Giles W. Mead, director of the Los Angeles County Museum of Natural History. She is an expert phycologist, or specialist in the study of algae, an accomplished aquanaut and a strong leader. Her team of sun-bronzed scientists included Dr. Renate Schlenz True, Mrs. Ann Hartline, Miss Alina Szmant, and Miss Margaret Ann Lucas.

Before Mrs. Mead plunged into Great Lameshur Bay last spring, she said to newsmen: "The only thing we won't be able to do down there that men can do is grow beards." She was right. But women's movements had best look elsewhere for support. Mrs. Mead is too busy to have much sympathy with protest demonstrations and speeches. "As for the women's liberation movement," she said, "I view it with an equanimity that approaches indifference."

The number of government agencies and other organizations involved in Project Tektite—which cost less than three million dollars—defies enumeration. They include, besides NASA, the Departments of the Interior and Health, Education and Welfare; the U.S. Navy and Coast Guard; the Government of the Virgin Islands; the National Science Foundation; the Smithsonian Institution; the University of Pennsylvania; the Marine Biomedical Institute of the University of Texas Medical School; Texas A. & M.; and many more universities, foundations and the like. The missions of the group were equally varied.

But for all the outpourings of preliminary findings and publicity puffs, the remark of one Tektite scientist perhaps best sums up the spirit of this enterprise. Said Dr. Ed Clifton, an aquanaut-geologist: "If you lie very still, you can study the underwater prairie, which is shifting and moving. It gets so you can stand on the bottom and just about hear the surf breaking on the rocks a million years ago."

Surrounded by bunks, the women sit over a meal. Dr. Mead is in blue shirt. Others (clockwise) are Alina Szmant, Peggy Lucas, Ann Hartline and Renate True.

Members of men's mission dry off in habitat's wet room before entering living room. This area is always open to the sea at the base.

For safety's sake, aquanauts always work in pairs. Bill High and Alan Beardsley test a shark-protection cage on the sea floor.

DDT: It is needed against malaria, but for the whole environment...

By James W. Wright

A quarter of a century ago Greece had two million cases of malaria a year; last year it had seven. This decrease is one measure of the largest and most successful public health program ever undertaken: worldwide eradication of malaria. Credit for our success to date belongs to the insecticide, DDT. By spraying it on the inside walls of houses, we kill the mosquitoes that carry the disease, and in doing so we do no significant harm to man or his environment.

Now, though, the supplies of this material with which we are saving lives and improving health are threatened. Because of its indiscriminate use in the past, many are demanding an equally indiscriminate worldwide ban.

Such a ban would make our program forbiddingly expensive. Although we are working on substitutes including other insecticides and biological controls, none of them is ready for large-scale use at a price that the nations in need can now afford. Legislation against manufacture and export of DDT, particularly in the United States, can bring a major international disaster: the return of malaria epidemics—suffering and debilitation from hundreds of millions of cases—deaths from tens of thousands of them.

This malaria program is the most striking of several ways in which the persistent synthetic organic insecticides have brought immense benefits to people in almost every part of the world. During the last 25 years they have been particularly useful in developing countries of the tropics and subtropics. This group of chemicals revolutionized the whole concept of control of disease-carrying insects. For the first time in the history of public health, it was possible to contemplate the control and even eradication of some of the insect-borne diseases that have, for centuries, been insurmountable barriers to social and economic progress. Through their use, epidemics of typhus fever, yellow fever and plague are now rare, and those that do occur can be readily controlled; sleeping sickness and river blindness are being cleared from some of the most fertile areas of Africa; diseases such as relapsing fever and hemorrhagic fever are being brought under control in many countries.

In 1945, when control based on spraying of persistent materials was begun, almost 1.8 billion persons lived in malarious areas, the majority in rural communities. To assess the human suffering and death from this disease is almost impossible, but it has been estimated that each year malaria was contracted by 300 to 400 million persons and that it killed between three and four million of these. Losses to agricultural and industrial production are beyond measurement. In 1955 member countries of the World Health Organization (WHO) embarked on a global effort to eradicate malaria. By 1969 this had been achieved in areas occupied by almost 700 million people; eradication programs were being carried out in places where another 700 million lived, and help and advice on eradication were being given to governments responsible for the health of the remaining 400 million who are exposed to the disease. Almost half of the objectives set in 1955 have been achieved and strenuous efforts are directed toward the rest.

These figures become even more impressive when they are related to specific populations. For example, at the end of World War II, the two million annual cases of the disease in Greece resulted in more than 10,000 deaths. A control program was started in 1946, [Continued on page 43]

As chief of Vector Biology and Control at the World Health Organization, Geneva, the author heads the program on disease carriers, their genetics, and uses and risks of pesticides.

Two authors present the pros and cons of persistent pesticides. Long considered mighty weapons against disease, they now threaten both animals and man

By Charles F. Wurster

DDT was a product of World War II, introduced when there were few effective alternative insecticides, when insect control was not well understood, when the word "ecology" was almost unknown and certainly seemed unimportant. DDT had been little studied (yet was considered "safe") and many thought DDT would be the panacea that would settle man's age-old struggle against the insects. All of these circumstances have long been reversed. In those earliest years the use of DDT was justifiable, but by 1950 it was apparent to many that its continued large-scale broadcast for a host of real and imagined needs meant trouble. Now, two decades later, the trouble is crystal clear and very serious; yet, as with so many technological "miracles" with a nasty backlash, an entrenched pro-DDT policy continues.

Because DDT travels within the air and surface waters, it does not remain where applied, but gradually becomes distributed to all parts of the world. DDT is quite stable (that is, "persistent"), thus retaining its identity many years after it has been used. As James W. Wright says in the companion article to this one, persistence is a valuable property for malaria control, but it is a double-edged sword. DDT is almost insoluble in water, but because it is more soluble in living tissues, it is accumulated by organisms from their environment. Living organisms for which it was not intended, therefore, become contaminated with a substance that has great biological activity, that affects nerves, enzyme systems and hormones, that can cause cancer and mutations. Thus, DDT is an inherently uncontrollable material once it has been released from its container, and it is senseless to speak of "controlling" its use.

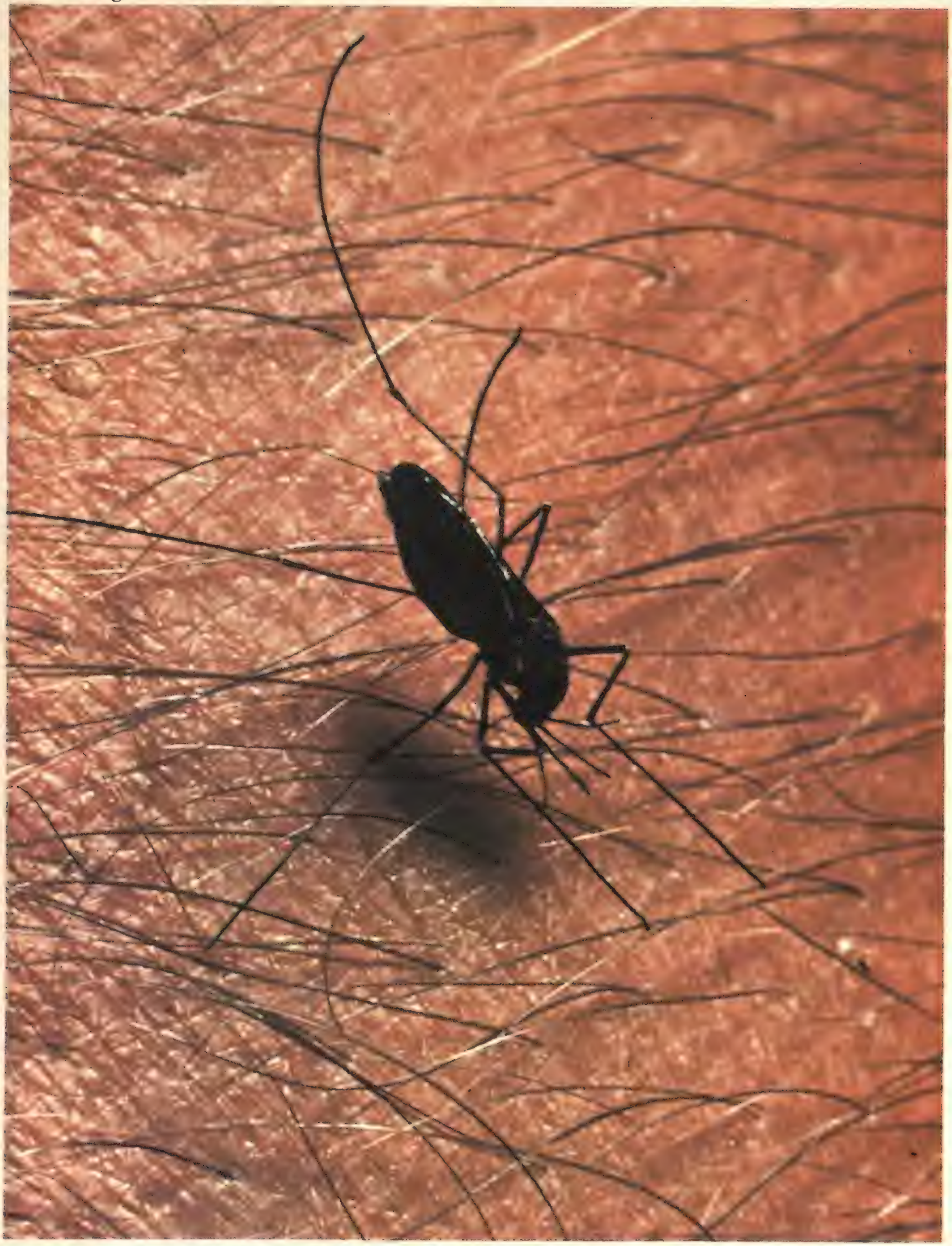
Wright's assertion that DDT presents little ecological hazard when it is applied indoors for malaria control would appear untenable. Some of the DDT becomes a gas and forms suspensions in the air when it is applied, thereby escaping into the environment. It is often claimed that residues no longer present at application sites have broken down, but we now know that the material merely disappears from one region only to reappear where it is not wanted. One cannot claim the virtues of persistence for malaria control without recognizing that the material also persists in the environment.

Most of the animals of the earth are now contaminated with DDT and its degradation products, including those that live in remote polar regions and in the oceans. It is present in penguins and polar bears, oceanic fish, birds and whales, in human tissues and embryos, in mothers' milk and cosmetics. The thought is sobering, and we are only beginning to understand its long-term consequences.

The natural feeding habits of an organism largely determine its exposure to DDT. Residues of DDT are passed up the food chain as one organism becomes food for the next. The food material is metabolized and excreted, but the DDT is retained, thereby becoming more concentrated in the higher organism than it was in the food organisms. As DDT passes up food chains, therefore, it becomes more concentrated, reaching the highest levels in the carnivorous animals at the tops of these food pyramids. This biological concentration causes top carnivores—various fish, birds and man—sometimes to accumulate concentrations of DDT more than a million times greater than those present in their environment.

[Continued on page 46]

The author studies DDT effects, on organisms that are not its targets, at the State University of New York, Stony Brook, and heads an Environmental Defense Fund committee.



Anopheline mosquito (shown seven times life size on an arm) carries the malaria parasite.

[Continued from page 40] and within three years the number of cases reported each year had been reduced 40-fold to 50,000.

The Republic of the Philippines had 20 million people in 1951 when a survey showed that two million of these suffered from malaria each year, with 10,000 dying from its effects. Absenteeism among students of primary and grade schools was between 40 and 50 percent daily and many large industries reported a 35-percent loss of manpower, practically all of which was attributable to the disease; each year approximately 20 million man-days of labor were lost. Eradication was started in 1957; since 1960 the average number of reported cases has fallen to 40,000 and the number of deaths each year is now less than 1,200.

The most ambitious eradication program in the world is being undertaken in India and is designed to protect more than 500 million persons. Before this campaign was started in 1953, it was estimated that 75 million people suffered from the disease each year; in 1968 the number of cases reported annually had fallen to 300,000. In the fourth five-year development plan for 1969-74 the Indian government has allocated almost $150 million for support of the program.

Unique properties of DDT

Besides these direct benefits to health, malaria eradication has also brought impressive social and economic improvements in many areas. For example, the Terai of Uttar Pradesh in the foothills of the Himalayas has some of the most fertile terrain in India. Before malaria eradication was started, all efforts to settle and exploit it had failed. Today it is one of the most prosperous parts of the country. Malaria eradication in Ceylon also opened large tracts of previously unoccupied land to farming. In one district, over 200 square miles of such terrain was brought under irrigation and was settled by 91,000 previously landless persons.

DDT has made these achievements possible, and there is little hope that global eradication can be brought to a successful conclusion without its continued use. For many reasons, this insecticide has a number of unique advantages.

It is a biological necessity that the female of this mosquito take a blood meal before she lays her eggs, usually by seeking out man in his home during the hours of darkness. In doing so she generally rests on one of the interior wall surfaces of the house, either before or after biting. After feeding on the blood of an infected person, the mosquito must then survive for at least another 10 or 12 days before she can transmit the parasite she has thus acquired to a healthy individual. Internal wall surfaces of all human dwellings in malarious areas are therefore sprayed with an even film of insecticide, enough to kill the mosquito but too little to represent a hazard to man. In countries such as Italy and Greece, where malaria transmission occurs for no more than six months each year, one application of DDT each season is enough; in others, such as the Philippines and India, two or even three applications in each 12-month period are necessary.

DDT spraying for malaria represents little danger to ecosystems. Application is concentrated entirely indoors and directed essentially at the adult female mosquito; as males do not feed on blood, they do not enter houses to any extent and are ignored. Vegetation in the open and streams and pools and other outdoor mosquito breeding and resting places are not treated extensively with pesticides (although draining and sanitizing of breeding areas complements spraying programs). The insecticide therefore does not contaminate the general environment where it might come into contact with wildlife. As it does not in these circumstances contaminate water systems, it can have little effect on food chains and, through them, on higher organisms.

For economic reasons, amount of insecticide and frequency of application are held to a minimum compatible with efficiency. Research has shown that for the most part the insecticide thus applied remains in the body of the treated wall until the DDT breaks down chemically, particularly in homes built of mud and on wall surfaces that are replastered or re-covered regularly for religious or aesthetic reasons.

What are the special characteristics that make DDT so essential for malaria eradication? In the first place it has a marked ability to kill the adult anopheline mosquito. A surface treated with two grams per square meter (a one-ounce whiskey jiggerful will cover a 12-by 12-foot wall) will be lethal for periods up to six months to the intruding female mosquito. No acceptable substitute insecticide has shown itself to be persistent for more than three months.

Deadly to insects; safe for man

In addition it has been particularly favorable from the viewpoint of insecticide resistance. Since the advent of the synthetic long-lasting insecticides, development of resistance has been a major challenge to entomologists. Many important insect species no longer can be controlled with DDT, and this condition has necessitated replacement of this insecticide with other suitable compounds. Notwithstanding the exposure of anopheline mosquitoes to DDT for more than two decades in almost every part of the world, however, only in one percent of the areas treated has this mosquito developed enough resistance to make malaria interruption impossible. The main reason is

James Wright, continued

genetic; DDT resistance in most anopheline populations is recessive. The fact that only female mosquitoes entering houses are exposed to the insecticide is also important. This exposure limitation greatly reduces the selection that is fundamental to emergence of resistance in insect populations exposed to insecticides.

Moreover DDT has shown itself to be remarkably safe for man. Since malaria control was begun in 1945, no toxic effects have been recorded among the 200,000 or more spraymen who have been employed over long periods or among the hundreds of millions of people who have lived in houses that have been sprayed for a number of years. These observations are confirmed by extensive health monitoring in DDT factories on persons exposed to massive doses of the compound. Although some of these men had concentration in their fat 50 times as high as that found in the normal U.S. population, their general standard of health did not differ from that of the normal population. In fact the only recorded cases of DDT poisoning have been in persons who had deliberately or accidentally ingested large quantities.

Not least among the advantages of DDT is its low price. DDT is the cheapest residual insecticide yet produced in quantity, and its cost has not varied to any marked degree over the last ten years.

Large quantities of the compound are required annually to meet the needs of the global malaria program. Peak consumption was reached in 1961 when more than 64,000 tons were consumed. Even this affected only 15 percent of total world production. In 1969 the quantity used fell, and the average quantity will continue to fall as eradication is achieved.

Although the insecticide is now manufactured in a number of countries, the major source of the water-dispersible powder essential for malaria work is the United States. This country's unique ability to mass-produce a high-quality product cheaply has been vital to the development and maintenance of the global malaria program. The world is now almost completely dependent on this source of production to continue existing malaria eradication programs at their present level, to consolidate those in which eradication has almost been reached and to begin work in those countries that are still in the planning stage. If U.S.-manufactured DDT were no longer available to the developing countries a critical situation would be created. Development of alternative sources of supply elsewhere would take many years, during which time the lives and health of millions would be jeopardized.

A World Health Organization spray team goes to its work of malaria eradication on elephant back.

DDT sprayed on interior house walls kills disease carriers as they come to bite their victims.

The countries of the world are well aware of this problem and its possible consequences. The concern of India, Indonesia, Nepal, Mongolia, Ceylon, Thailand and Burma—countries in which malaria is still a major public-health problem—was clearly expressed in a resolution passed at the 22nd session of the WHO Regional Committee for Southeast Asia, held at Katmandu, Nepal, in 1969. It asked WHO to request countries producing DDT to continue to do so for the benefit of public-health programs until an equally economical insecticide could be made available in place of this insecticide.

Looking for better methods

WHO is attempting to satisfy the urgent need for new groups of insecticides to meet the challenge of insecticide resistance and to fulfill its duty to prevent environmental pollution. During the past 12 years, in collaboration with the chemical manufacturing industry and through cooperating universities, independent institutions and field research units, it has evaluated effectiveness against insects of more than 1,400 new chemicals, with emphasis on safety to mammals and potential environmental contamination. Now available are several safe, effective and biodegradable compounds that could replace the chlorinated hydrocarbons in controlling almost every insect species of public health importance. Some of these are now in use in malaria-eradication programs in different parts of the world where resistance to DDT has occurred. These insecticides are now 12 to 20 times more expensive than DDT, however. If national health administrations were forced, through circumstances beyond their control, to turn to these new and expensive insecticides, they would be compelled to stop, or at least to reduce drastically, the level of their operating programs. An example of what might occur was recently reported from Ceylon. (I must stress that the situation there was not due entirely to lack of DDT.)

By 1963 endemic malaria had virtually disappeared from Ceylon, and the eradication program had reached a stage of consolidation and surveillance. Because of operational deficiencies, administrative problems, lack of funds and insecticides, and a series of unusual meteorological conditions, a rapid deterioration of the situation occurred from 1967 onwards. Epidemic conditions reappeared, and it has been estimated that during 1968 and 1969 considerably more than two million cases occurred with large numbers of deaths. Similar resurgences, and on a far greater scale, would inevitably occur in other countries in the process of eradication should the cost of DDT rise, or should supplies be cut off or even reduced at short notice.

WHO is also supporting an extensive program on genetic and biological controls that might reduce or even eliminate the use of chemicals for control of disease-carrying insects. With assistance from the U.S. and Indian governments a WHO Research Unit for the Genetic Control of Mosquitoes has been established in New Delhi. During the next seven years it will investigate genetic manipulation as a means of reducing mosquito populations, including the malaria carrier, *Anopheles stephensi*. In West Africa, WHO is also studying hybrid sterility, another genetic technique, as a means of controlling another malarial mosquito. WHO has been exploring predators, parasites, fungi and viruses as disease-carrier controls for ten years and will expand the program considerably in the future. However, it may be as long as ten to 15 years before any of these procedures can possibly be used operationally.

In considering continued DDT use in malaria-eradication programs, one must weigh the possible hazards against the advantages. Thus, in most countries of Europe and North America, where the disease is no longer a serious problem, there is ample ecological justification for limiting its use. On the other hand, in the developing countries of the world, where malaria represents a serious social and economic problem, the continued use of the insecticide will be vital until effective and economical alternatives become available.

It would be tragic if legitimate action taken by governments to limit the use of DDT interfered with social and economic progress of developing countries. Any action taken to limit availability to these countries for purposes of ecology should be weighed carefully against the sufferings it will bring to millions and the deaths it will bring to thousands.

Teams of malaria fighters in India assemble for a group picture with their field equipment.

Charles Wurster, continued

During the past two decades certain carnivorous birds have undergone unprecedented population declines. Since 1950 the peregrine falcon, the spectacular bird of falconry since the Middle Ages and a species known for the great stability of its numbers, has declined by 60 to 100 percent in Europe and Russia, by 95 percent in western North America and to extinction as a breeding species in eastern North America. The bald eagle, osprey, brown pelican, Cooper's and sharp-shinned hawks and a number of other species have also been affected. The brown pelican, for example, is largely gone from the Gulf Coast where it was abundant 20 years ago, and the species is declining rapidly along the California coast. The primary problem with these birds is failure to reproduce adequately.

For years these phenomena had no obvious explanation, but during the past five years scientists have solved the mystery. These species feed high in the food chain, and biological concentration leads to high levels of DDT contamination. DDT is an inducer of liver enzymes that break down sex hormones, including estrogen, that are responsible for various aspects of reproduction. With a diminished estrogen supply, the female bird no longer shows normal reproductive behavior. Simultaneously, DDT and its metabolites inhibit the function of the enzyme carbonic anhydrase in the shell gland of the oviduct. Since this enzyme is required for normal eggshell formation, DDT-contaminated birds lay eggs with abnormally thin shells that break prematurely in the nest and produce no chicks. These birds have been laying eggs with shells so thin that they collapse when the adult birds try to incubate them. Nesting areas are sometimes littered with broken eggs, and few chicks hatch. The combined enzyme effects have reduced reproductive success to less than ten percent of normal in some regions, and populations have collapsed. Unless the use of DDT is stopped, we can anticipate suppression to very low levels or extinction of many of the existing species of carnivorous birds.

DDT also reduces reproductive success in fish, but the mechanism is different. As with birds, effects were observed in nature before they were produced under controlled conditions in the laboratory. DDT had been applied to the watersheds of several lakes in New York state, but it was several years before it was realized that DDT had caused the complete mortality of lake trout fry observed in these lakes. There has been no successful reproduction of these fish for a dozen years. Although DDT did not kill the adult fish, it killed the fry soon after they hatched from eggs with DDT-contaminated yolks.

DDT has caused reproductive failure among fish in other areas as well. In Lake Michigan, ten to 50 percent of the Coho salmon fry were killed by the general contamination of the lake with DDT, and abnormal trout fry mortality has occurred in Canada and New Zealand. The concentrations of DDT that have been shown under both laboratory and field conditions to kill fish fry are now being approached, or in some cases are already equaled, in some of our major freshwater and marine fisheries. It is ironic that we are endangering important fisheries that are a source of protein from the sea in the name of insect control on land.

The birds, fish and other organisms that live with man on the earth should be viewed, like the canary in the mine, as monitors of environmental quality. The present, obvious warnings should not go unheeded in favor of short-term, often illusory benefits that can be had by other, less damaging methods. The loss of these predators disturbs ecosystems on which man's ultimate survival and his quality of life depend.

Studies don't tell us enough

Based on observations of prison volunteers and persons occupationally exposed to DDT, much has been said by Wright and others about the safety of DDT for man. Unfortunately these studies have serious deficiencies; they prove only that people are not dying of acute DDT poisoning, nor are they suffering overt toxic symptoms. Only men were examined—no women or children. The number of subjects was too small and the time period too brief to detect long-term, low-incidence damage. Whereas animal experiments indicate that DDT causes cancer and mutations and induces liver enzymes that break down sex hormones, the examinations of the men evaluated none of these factors. Despite Wright's contrary opinion, more rigorous examinations of workers occupationally exposed to DDT in the Soviet Union revealed numerous abnormalities in liver, stomach, kidney, enzymatic and

neurological functions. It is remarkable that although billions of people have been exposed to DDT for more than 25 years, it has been tested in the United States on only a handful of men.

Because experimentation with human subjects is often difficult or impossible, we must employ laboratory animals as substitutes and consider the results as probably applicable to man. Competent, controlled animal experiments with DDT tell us much about its biological behavior; it is extremely active biologically. Four different studies involving rats, mice and trout have shown that DDT is a carcinogen, that is, a cancer-causing agent. Carcinogenesis in these animals indicates a high probability, but not a certainty, that DDT is a human carcinogen and that the current contamination of the general population is responsible for an increase in the incidence of cancer. This probability is further supported by two studies showing that human victims of terminal cancer contain more than twice as much DDT in their tissues as is found in the general population.

It probably is hazardous to man

Research with rats has shown a mutagenic effect with DDT. As with carcinogenesis, mutagenesis in rats indicates a probability, but not a certainty, that DDT affects human genetics. Some effects of DDT may occur, therefore, in future generations. The induction by DDT of liver enzymes that cause breakdown of steroid sex hormones has been known for more than a decade in laboratory animals, and recently has been shown to occur in man. Although we know that DDT causes increased hormone breakdown in man, we do not know what physiological effect this has. It is strange that experimental results with laboratory animals involving accepted, standard procedures for evaluating other chemical hazards, including those experiments on which pesticide registrations themselves are based, are not accepted by DDT proponents in the controversy over DDT. The principal hazards of DDT to man (carcinogenesis, mutagenesis and enzyme induction) have been ignored and could not have been detected in the primitive studies Wright cites as indicating the safety of DDT for man. Nevertheless, the available evidence implicates DDT as a health hazard in the human environment.

Decision makers should evaluate both the benefits and risks of a pesticide. While the risks of using DDT are increasingly apparent, the benefits are frequently illusory, diminishing but exaggerated by DDT proponents, and attainable by alternative procedures. Although Wright disagrees, many say that insect resistance to DDT has become a severe problem. When heavy mortality is imposed on an insect population, a

Endangered species include these carnivorous birds. Eating high in the food chain, they acquire unusual amounts of DDT. From top, peregrine falcon chicks, the bald eagle and osprey fledgings.

Charles Wurster, continued

small percentage survive because they have traits with survival value. They repopulate the region, and the protective traits become more prevalent. Repetition of this process generates resistant populations that can no longer be killed by the original insecticide or dosage. Resistance has rendered DDT ever less effective over the years.

Resurgence is a more serious problem. Even in the one-crop cultivations of modern agriculture, insects live in complex communities involving hundreds of species. Predatory and parasitic insects usually keep the plant-eating, potential pest insects under biological control so that only a very few reach pest proportions and require artificial suppression. The use of a broad-spectrum poison such as DDT kills all insects, creating a biological vacuum. With ample food (plants) available to the herbivorous insect survivors, the former pest species, or a new one, resurges in the absence of its natural enemies to levels far greater than existed before the DDT treatment. In this way, DDT often aggravates the very insect pest problem it is intended to solve; it creates the illusion that more DDT is needed to alleviate a pest problem that DDT itself has caused. DDT is an ideal product for the manufacturer because its use often generates the apparent need for more of itself.

Despite emotional appeals about the need for DDT in food production, less than one percent of the food crop acreage of the United States is treated with DDT. About half of all the DDT used in this country is applied to cotton where tolerance limits do not apply; resistance and resurgence problems have led to ever greater dosages of DDT, with associated lower profits to cotton farmers and increased environmental contamination. Entirely too often farmers seek advice on insect control from pesticide salesmen rather than from competent and impartial entomologists.

Modern agriculture cannot afford the numerous problems and high costs of a pure chemical approach to the control of insect pests. A sounder solution that avoids most of these problems, being both effective and economical, involves integrated control, where chemical and biological techniques are ecologically blended into a compatible system. Such insecticides as methoxychlor, Dibrom, Abate, Sevin, malathion, Dipterex, chlorthion, dimethoate, ronnel, diazinon, pyrethrum, rotenone, Sabadilla, ryania, dichloroethyl ether, various petroleum oils and many others are used only when and where necessary in minimal amounts and in such a manner as to preserve as much as possible those beneficial biotic agents (parasites, predators and organisms that cause diseases in insects) that aid in controlling the pest species. DDT plays no role in such a program because it is persistent, broad spectrum and therefore highly disruptive within an agricultural ecosystem. Insecticides such as those mentioned are effective and less disruptive, and because they are nonpersistent, they do not contaminate and threaten nontarget organisms in that part of the environment that is nonagricultural.

DDT has played a vital role in malaria control in many parts of the world, though again its benefits are

Sharp-shinned hawk, Cooper's hawk and brown pelican (from left) are threatened by insecticide accumulation. The chemicals interfere with shell formation, and few hatchings are successful.

often exaggerated. Malaria was declining rapidly in the United States before the DDT era began, but DDT aided in eradicating the remainder. The only malaria now present in this country is that brought in from other parts of the world, and this can be controlled by methoxychlor, malathion and various nonchemical techniques, should it show signs of spreading.

In other parts of the world, DDT is no panacea to malaria control. Malaria cannot be eradicated from the earth by DDT or any other known device. Only new discovery from continued research can achieve that objective. DDT successfully eradicated malaria from those regions where the job was relatively easy, as in Greece, whereas in more difficult areas such as Africa there is as much malaria as before. Because of resistance and other factors, malaria has resurged in many parts of the world in spite of, and sometimes even because of, the use of DDT. Only in those malarious underdeveloped countries that for economic reasons can afford only DDT in their control programs does the continued use of DDT carry benefits that remain greater than the risks. The rest of the world can achieve its benefits by a host of alternative techniques —some already available, some yet to be developed— and can no longer afford its great risks.

Although DDT use in the United States has been neither necessary nor desirable for years, effective limitations have not come from the United States Department of Agriculture. Headlines tell us that DDT has been banned, but substantive action is lacking, and DDT continues to be poured into our environment. The DDT problem is a symptom of a greater disease in which the regulatory structure is more responsive to the industry it is supposed to be regulating than it is to broader environmental considerations. There will continue to be nightmarish pesticide problems until this central regulatory deficiency is recognized and alleviated.

[The Department of Agriculture says it is now preparing a cancellation notice, and a suit is pending against it that demands a complete ban.]

DDT is usually considered a cheap insecticide; at 17 cents per pound it is the cheapest insecticide on the market. Costs, however, must be measured, not in cents per pound, but in effective and safe insect control. Not only is DDT often ineffective in controlling insects, but also DDT proponents regularly forget the other cost of DDT—the irreparable environmental damage it is doing. Using this measure, DDT has become the world's most expensive chemical.

Bull seals stake out harem boundaries at Tolstoi rookery and patiently await females.

By Victor B. Scheffer, with photographs by the author

New life burgeons at an Alaskan fur-seal rookery

A golden-colored seal gives birth to a pup and is freshly impregnated during one summer month on an island's crowded rocks.

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A thin cry like the bleat of a newborn lamb is lifted by the wind and carried along the shore. It speaks of fright, and of a strange world, and of cold air, and of the bitter spray that rises from breaking waves. It speaks of beastly forms moving around and above the source of the cry, their shapes all dark and dimly seen.

In a pool of black mud, a black fur-seal pup struggles to free himself from a gauzy membrane—the amniotic sac in which he is being delivered from the womb of his mother. His mother, the Golden Seal, arches her back and pushes her nose against his body. In the dim past of her race, a mother-animal, somewhere and sometime in a cave, would seize her offspring, free it from the birth sac, and lick it clean. But few of these maternal duties does the Golden Seal now perform; she and her kind are gone too long from the cave. Before she dies she will give birth to five more pups and will miscarry one. Each will be a replica

A swarming mass of females, numbering in the thousands, joins the waiting males at the rookery.

of the one before it, and in the process of each birth she will offer only the simplest of care, an abbreviated ritual of mother love. Now she nuzzles her baby and sucks in deeply the odor of his wet, steaming body. She learns to identify this one creation among thousands like him, so that soon, when she begins her summer-long schedule of giving milk, she will be able to find her own pup at each nursing time in a mob of thirsty little strangers.

The pup staggers wildly through the filth of the rookery, dragging the placenta on its short umbilical cord. Instinctively, he pushes toward the warmest part of mother's body, the left side of her belly where she has lain toward the sun. He shakes convulsively; he rolls his dark eyes; he lifts his muzzle to the sky and gives a cry that pierces the wind.

Above the full chorus of a thousand voices, young and old, it threads its way along the corridors of gray volcanic boulders standing erect and polished by the shoulders of generations of seals. It floats across an open tundra where yellow arctic poppies dance on the summer days. It carries at last, this thin cry, to the ears of a great bull seal who lies with unseeing eyes on a slab of rock above Tolstoi rookery. He is dying.

Here he crawled in June, out of the Bering Sea of Alaska, up the slanting shore of St. Paul Island, across green sands manured by the seals of the previous year, on to the slab of rock, here at last to lie without food or drink for a month. Age and illness and a thousand little deaths have done him in. The urge to return in spring and to challenge his fellow mates for a beach-

This story is excerpted from the author's new book, The Year of the Seal, *Charles Scribner's Sons.*
A veteran Fish and Wildlife biologist, Scheffer also wrote the award-winning Year of the Whale.

A bull with harem takes his lordly ease
beside the Bering Sea at the height
of seal-pupping season in early July.

head has brought him once again to the place where he was born 24 years ago. In breaching the surf for a landing he was attacked by a younger bull, and he suffered a deep wound from ear to throat. In the days of his prime the red gash would have healed, but now the tissues will not close. Paralyzed, quiet, staring toward the sea—his other home—he hears a last sound, the testimony of a new life.

In early July the pupping season on Tolstoi is at peak. Seals are born at the rate of one every two minutes, day and night. A vast continuous undertone, like the roar of a crowd in a sports arena, or a distant waterfall, is pierced briefly by the cries of individual pups and by the raging of white gulls fighting for bits of rookery debris. Five hundred bulls of breeding age, the "harem" bulls, are stationed on individual territories. Ten thousand breeding females are sprawled on the ground beside them, resting or nursing; two thousand females with newborn young are feeding in Bering Sea, preparing to return to their pups on the rookery; and ten thousand females heavy with unborn young are still moving north to Tolstoi, soon to rest their bodies on land after many months at sea.

Seal pup starts nursing

On the morning of the third of July, the Golden Seal gently seizes her pup by the scruff of his neck and drags him up the slope of Tolstoi out of the mud to a sandy, well-drained clearing. She would carry him farther, to the lee of a rock, but the harem bull sees the movement from the corner of his eye and comes rolling toward her with ponderous gait and a menacing "Chunk! chunk! chunk!" from his open jaws.

Here on the sand the mother rests, while the birth blood dries on her flanks and the rich gold of her breast fur glows in the dawning light. The color blends with the gold of the crinkly lichens that decorate the rock face beyond her.

The pup has found a black nipple the size of a man's little fingertip—one of four on her belly—and has pulled it for the first time from its crypt in the fur. He has suckled and is replete. He sleeps heavily, snoring, and the mother sleeps. She is very tired, for she is a small seal—she weighs only 50 pounds—and she has brought to light a ten-pound baby. She twitches in a dream. She "swims" in jerky motions of her naked hands. Her nostrils flare at long intervals to breathe. She is not yet wholly a creature of the land but is locked-in on the rhythm of the sea. . . .

The days go by, and on the seventh of July the Golden Seal comes suddenly in heat. Her womb is shaped like a V, with two horns that function in alternate years. The newly emptied horn, which was of monstrous size on the first of July, is shrinking rapidly

"A black fur-seal pup struggles to free himself from a gauzy membrane—the amniotic sac in which he is being delivered from the womb."

"Now she nuzzles her baby and sucks in deeply the odor of his wet, steaming body. She learns to identify this one creation among thousands . . . ."

"The normal pup is glossy black with only a trace of white in the armpits. The eyes are as black as those of an Oriental doll."

A baby seal is born

to the size of a lemon and is draining cleanly. In the other horn, no thicker than a pencil, a ripe egg is moving down from the ovary. . . .

Mother and pup have been lying at the edge of a territory guarded by a 12-year-old, 440-pound bull. He outweighs her more than eight to one. This is only his third year as a harem bull, but it is also his last. The competition on Tolstoi is so fierce, and the turnover among breeding males is so rapid, that next summer he will find his station preempted by a newcomer, a bull no stronger but more aggressive.

Now the bull circles his territory, clambering over rocks and trampling brutally on the flippers of any seals that happen to be in his way. He smells the nose of each female, one by one, in a curious ritual that brings a bouquet of white whiskers sharply to the front of his snout. He is searching for a female in heat, which will be indicated by the yeasty smell of her breath. In the act of nosing, he shows no affection, but rather suspicion bordering on hostility.

When he reaches the upper rim of his territory he sees that the Golden Seal has deserted her pup for the first time in nearly a week and is standing a few yards from the sleeping baby. He advances, touches her nose, sniffs, and gives a low snort of excitement. She responds with a hiss. Both call-notes are part of a threat pattern; they seem out of place as overture to the love play about to begin. The bull circles awkwardly and tries to smell her hindquarters, but she turns quickly and bites his throat. The nip has no effect through the protective armor of hair, fur, skin and blubber.

Now the pair circle and joust in a clumsy dance on the rotting debris of Tolstoi beach. They rub noses repeatedly. Their whiskers interlock. She bites his neck and then his lower jaw. He roars and hisses and chuckles. She finally pauses, boosts her back and allows him to smell her attractive rear, swollen and flaring a brilliant pink. He mounts, dog fashion, and impregnates her in a six-minute act. So great is the difference in weight between the pair that her head is barely visible under his chest, and her dark eyes bulge.

A rank, musky, wet-dog odor rises from his sweat glands. Oh, but he stinks! "Web-footed Seals forsake the stormy swell, and sleep in herds, exhaling nauseous smell. . . ," wrote Homer.

The bull saunters away and takes up patrol where he left off. Today he will search out and mate with three other females. The Golden Seal lies quietly until she hears the cry of her hungry pup. She returns to his side and nurses him. Later she will try again to attract the bull, but he will only pause briefly to smell her rear before he moves along.

South of the hill of Tolstoi lies a soft, open plain, above which the rounded remains of old volcanoes rise to the sky. The plain recalls Wyoming in spring, but here there is no tree or shrub. On the hilltop a willow spreads its branches, covered with catkins, in a mat 10 feet across, but the whole plant is only as high as a man's ankle. . . .

Fishing for corpses

On the ridge of Tolstoi a man appears. He is a biologist, and he carries a fishpole. He is in his middle 50s, roughly built, with a face reddened by ocean winds. The straps of a yellow sou'wester are tied beneath his chin; a raincoat hangs to his knees, while hip-length boots complete the uniform of the day. The raincoat is a sorry thing, all splotched with blood, bile, and laboratory chemicals. Its hem has been torn by the teeth of angry seals. . . .

Moving slowly, so as not to frighten the seals, he climbs a short ladder that puts him on a catwalk, a wooden structure 500 feet long. It is a trail six feet above the rookery where a man can walk above the heads of the seals and be well out of reach of their sharp teeth. He stops. He bends down with the fishpole, line and hook, and snags the lifeless body of a pup wedged between two rocks. He lifts the malodorous thing, numbers it with a tag, and places it in a burlap bag, then moves along the walkway. Every second day in July he has followed the same routine, collecting the bodies of pups that died since his last inspection of the route. By ten o'clock he has gathered 14 specimens. In his laboratory in St. Paul village he dons rubber gloves and, with a scalpel, examines the little bodies post mortem. . . .

Because the critical factor in life is often the food supply—the basic energy input—wildlife biologists look first at the possibilities of increasing food. The best method of doing this is to kill a planned percentage of the population. Though ethics prevent the

doctor of men from using this straightforward tool, the biologist may do so to raise quality, at the expense of quantity, of life. . . .

The Golden Seal is restless. She is ready to abandon her pup for a few days and return to the sea. Her body tissues cry for moisture. Her fur is dirty and smelly. She has given up a gallon of milk, a rich milk with a fat content of more than 40 percent. She looks down at the small dark thing that came from her loins, and she looks away toward the sea where it breaks wetly on the rocks.

Suddenly she starts in alarm. Overhead the whine of an airplane grows above the roar of the surf. It is a new and dangerous sound. A twin-engined craft settles to the airstrip north of Polovina, dropping after a flight of three hours from Anchorage. As the plane glides in from the sea above the rookeries of the Reef, the passengers look down and see black-iron filings held on a brown plate by a magnet underneath. "Why, they're *seals—millions of them!*"

The visitors are caught in the excitement of the sharp break between the mainland forests and this bare oceanic island. They step stiffly from the plane and soon are intoxicated. They are intoxicated by waves of color—the ultraviolet of sky reflected from tundra flowers: blue lupine, red and purple fernleaf, purple primrose, pale blue forget-me-not, indigo monkshood, pink moss campion and the hues of other plants that burst in a riot of bloom to insure their fruiting while the brief summer holds.

In July, too, the sweet voices of the land birds rise upward and everywhere—the calls of the longspur, snow bunting, sandpiper and rosy finch. The rare, bubbling song of a wren comes faintly from cliffs along the sea. The calls thread back and forth from dawn to dark. They hold deep meaning to the frail creatures that give them voice and they offer a spirit-welcome to the tourist visitors from Anchorage. The colors and sounds of St. Paul Island all tell of a detached little world that has lived through centuries of time without the clever help of man and his institutions and devices —the kind of world that will forever pull at heart-strings and cry, "Turn back, turn back . . . this is the mother source!"

Back to the Bering Sea

The Golden Seal has made up her mind to leave the nursery. Down she goes, clambering over rocks and driftwood and the bodies of her sisters, dodging their snapping teeth as best she can. Some of the seals are dry and dirty-brown like herself; some are wet and silvery clean. These have just returned from deep-sea fishing trips like the one upon which she is about to embark. She catches a flipper in a crevice and, as she

In rare moment of apparent domesticity, a bull seal rests with a mate and pup nearby.

At ease in the author's arms, a small bluish-gray "Blue Ribbon" seal reflects mild curiosity.

A baby seal is born

struggles to free herself, drops of yellow milk spurt from a teat. At last she hits the tidal zone. Eagerly starting to swim with her flippers on the sandy beach itself, she heads for a breaking comber, shoots beneath it, and rises 30 yards beyond, leaving a muddy trail in the green waters of Bering Sea.

Meanwhile the tourists from Anchorage are rattling along in trucks over the red pumice road to the village and to the dormitory where they will spend the night. During the night they lie awake for a while, restless in the absence of city noise, but at last they sleep profoundly, lulled by the wind crooning at the corners of the frame building. After a breakfast of thick flapjacks, thick bacon and thick coffee, they visit Tolstoi in the company of a native guide. . . .

A camera buff from Seattle, with more nerve than sense, slips away from the group . . . and penetrates the harem of the Golden Seal. He does not realize his danger; he could be struck and torn by the bull. He focuses on a mother seal in labor and shoots 50 feet of film. The bull grows vaguely aware of an intruder but does not see or smell him. His brute mind translates the uneasy feeling as a threat or sexual competition. He blindly seizes the nearest cow by the throat and hurls her 15 feet through the air. She circles high and lands heavily on the rocks while a red fountain starts from her throat; he has cut an artery. She sinks uncomprehending, and in four minutes is dead. The photographer misses the tragic byplay. He returns elated with his pictures.

Toward the middle or end of July—the time varies from year to year with the weather—the annual breakup of harem life on Tolstoi begins. The family structures loosen. The bulls grow quieter; they retreat to the sea when a man approaches. On Tolstoi today there is no sign that the breakup is imminent, though the weather may change tomorrow.

The Golden Seal's pup has been sleeping without break since she left him yesterday. Now he drowsily wakens and looks around, though he is not alarmed by his mother's absence. At this stage in life he is only concerned about milk, and at the moment he is not hungry. His little belly bulges like a melon. He tries to scratch an itchy spot where his navel is healing; he cannot quite reach it with his flipper, so he mounts a rough pumice boulder and rides it blissfully back and forth.

A dozen yards away, something strange is happening. A half-sister of his mother is giving birth to a white seal. . . . The fur of the strange pup is creamy yellow and sopping wet; when it dries it will turn cotton white. Its flippers and eyes are pure pink. It blinks and squints and turns its head toward the dark rocks as though irritated by the daylight. The mother reacts toward the little freak exactly as she would toward a normal pup, with no more and no less attention to it. Only the biologist will know, when he peers down from the walkway tomorrow and sees this pup, that it represents one in 100,000 born. The slim probability of an albino birth is well established, since a white seal among black ones can be spotted from a great distance and biologists have been watching the rookeries of the Pribilof Islands for a long time. . . .

Mother's nursing—fishing cycle

As the days dwindle to the end of July the Golden Seal is far at sea on her third fishing trip. If by magic an unseen recorder could have been scribing the life of this little mother with a first-born young, the record would read as follows:

On July the first, she hauled out on the beach of Tolstoi. On the second, she gave birth to a male pup, head first, at the end of five minutes' labor. On the seventh, she came in heat and was impregnated for the second time in her life, in the resting horn of the womb. On the eighth, she went to sea to recover strength, leaving the pup asleep on the rocks. On the 15th, she returned to a ravenous youngster and nursed him often over a period of two days. She did not know that her mate had left the rookery, never to return, or that her harem was now ruled by another bull. On the 17th, she went to sea on her second fishing trip. On the 26th, she returned to Tolstoi. On the 28th, she went to sea for the third time and is now out there in the fog.

She will repeat the nursing cycles with great regularity. Her schedule is known from field observations and from studies of seal teeth. As long as any seal lives, it carries a record of its suckling days in light-and-dark bands of ivory in the roots of the teeth. If the biologist cuts a wafer-thin section of the root and holds it against a light, he can read the record.

To avoid being trampled to death by elders,
the smart pups on overcrowded Tolstoi rookery
quickly learn to nestle close to the rocks.

Harness racing circa 1890 was an enthusiasm for people whose horses drew plows and buggies; many of their descendants like it too.

By Pat McGorum

Fairs for market and also for fun

Attractions such as fortune telling, midway rides, farm animals and medicine shows have drawn crowds for centuries and still do

In a huge plaza, crowds amble from stall to stall. They finger gauzy yardgoods, they plunge a nose into a cloud of flowers, they appraise an ear of corn or a beet and pause to toss down a cooling drink. Beefy marshals keep order. Exhibitors hawk anything from pets to haircuts to tablecloths to bricks to gems. Clerks bustle about, collecting booth rents, inspecting merchandise, testing scales for fraud, smashing any that don't measure up. A dozen dour old Solomons sit in an office, listening patiently as they judge trade squabbles that unfold before them.

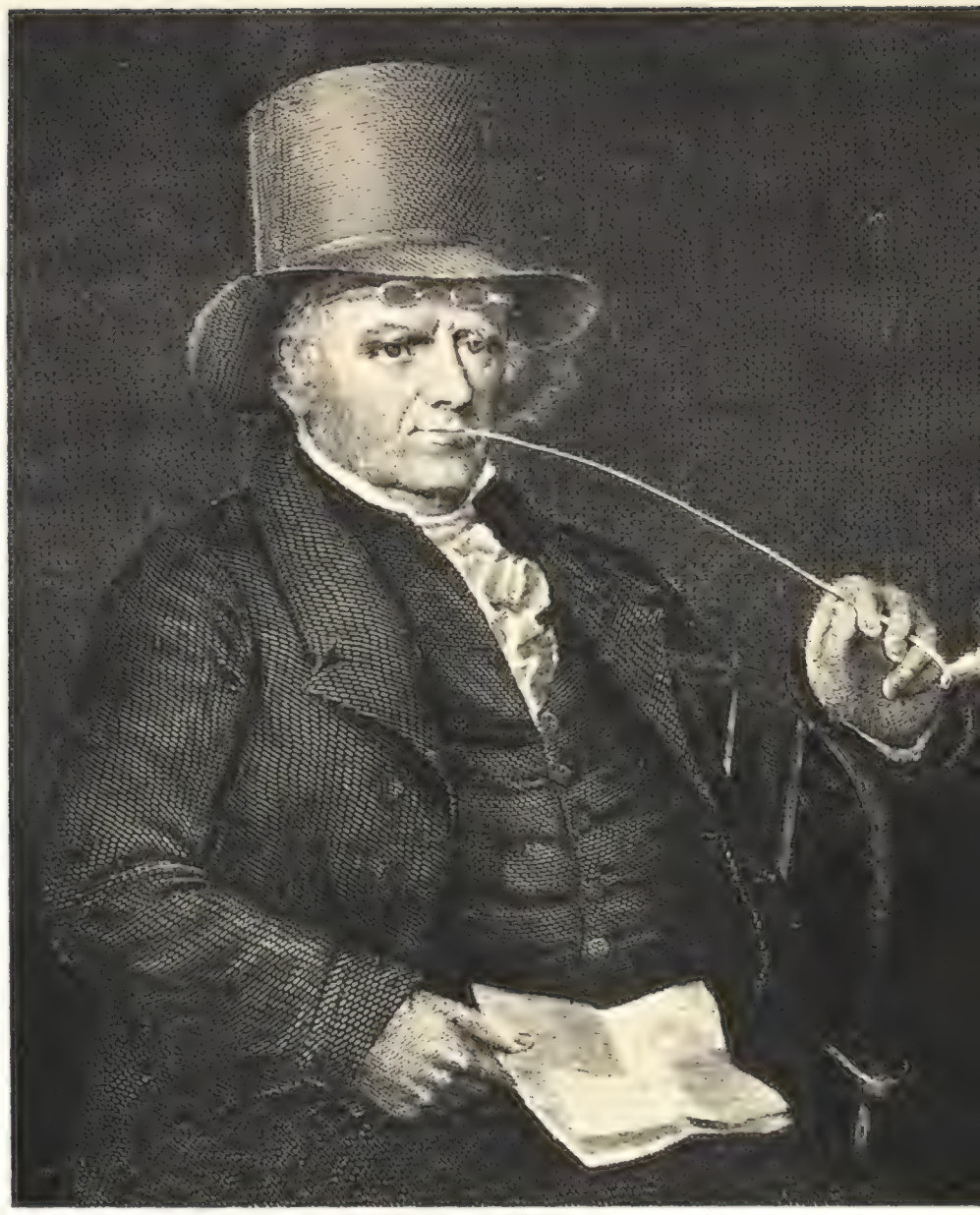
It's the European's first American fair.

What must the crowds all be jabbering about? The heat? The cost of living? Taxes? The war? No matter. One day he'll grind these Aztecs under his heel. But today Hernando Cortez is just another out-of-town rube come to gawk.

No wonder he gawks—the scene before him in Moctezuma's capital city of Mexico is almost a carbon copy of the market fairs of his own 16th-century Europe, right down to the piepoudre (dustyfoot) court!

Four centuries have pushed through the turnstile since Cortez and his conquistadors "were astonished at the crowds of people, and the regularity which prevailed." The Aztecs went; the English came; a baker's dozen of colonies burgeoned into a nuclear superpower that leaves bootprints on the moon. Yet there has scarcely been an American, from Moctezuma to me, who couldn't have gone to the fair.

As early as 1686, New Jersey's first colonial assembly



Elkanah Watson, founder of the county fair, began it all with an exhibition of two Merino sheep.

established a semiannual fair. English colonists dreamed of the great fairs of Stourbridge and Bartholomew and cast their own in the familiar mold. Soon every colony had its fairs—except Connecticut, which frowned on such frivolity.

It was an older mold than they knew. As old, probably, as the Neolithic hunter hankering for a flaxen cloak or the farmer for a juicy joint of venison.

As civilization began to bud, fairs often sprang up around religious festivals that drew the faithful from afar. Occasionally the weed choked the flower, until the only gods present were those of commerce, merriment, and of course the cheering cup.

Such was the stuff of America's early fairs, passed along from the Roman *feriae* through the peace-building fairs of Charlemagne down to the roughhewn gatherings that brought the pioneer out of the backwoods. His shoulders were piled with pelts for swapping, his pockets provisioned with pemmican or a bouillon-like "Veal Glue, or Cake Soup to be . . . carried in the Pocket without Inconvenience."

The fair was the woodsman's department store, supermarket, land office, social center and even marriage bureau. Back to his cabin he trudged with a new broadaxe, a deed to another ten acres, probably a hangover and a black eye, and maybe a sturdy bride.

Ah, but it was fun—and there wasn't much of that in his rugged life. He'd tried the whistling contest, and by the king's buttons he'd have won too, if his rivals hadn't succeeded in making him laugh in the middle of it. He had yelled himself hoarse at the cockfights and the cudgeling and gouging bouts, caught a face full of mud instead of the greased pig, and mugged outrageously in the grinning contest.

He'd shuddered at the taste of "Robert Turlington['s] invented balsam of life." But it might help ward off "Fluxes, which," warned the venerable Mr. Byrd, Esq., "Woodsmen are very liable to, by lying too near the moist Ground, and guzzling too much cold Water." And so a bottle weighted his pocket and lightened his heart—and enriched the potion peddler.

Local variations kept each fair unique. On Long Island, a Holland smock and a gown of chintz awaited the winner of the women's footrace. At Williamsburg runners puffed from the college to the capitol. Virginians might pay off debts at the fair, or shoulder new ones. Here was a sack race for a roll of tobacco, there an obstacle race for a plum pudding.

Behind the fun, the puppet shows and strolling fiddlers, the tightrope walkers and fortune tellers, the cutpurses and spielers and pickpockets and hucksters, the fair still played its ancient role. At Trenton, New Jersey, advised a notice in 1745, "will be held and kept a Fair, in the selling and buying of all Manner of Horses, Mares, Colts, Cows, Calves, Steers, Hog, Sheep, and all other Cattle, Goods, Wares and Merchandizes whatsoever."

But cities were growing and roads improving, and

The Indiana State Fair of 1886 offered its patrons the bounties of Ceres, goddess of agriculture.

folk were beginning to find better ways to buy and sell than to wait for the fair in the autumn, or in some places its twin in the spring. While some market fairs sank from sight, others simply capsized, their higher aims forgotten in gaiety and submerged in booze. The "debauchery, idleness, and drunkenness consequent on the meeting of the lowest class of people together is a real evil, and calls for redress," harrumphed Bristol's council in 1773; by 1796 the Bristol Fair was dead.

Others clung to life, some well into the 1800s. A judge in 1806 found himself stranded en route to "Allen's Town, Pennsylvania"; "This Boro," he fumed, "is enjoying the sweats of Annual Fair. I wish legislators would abolish fair nuisances. Dissipation makes uncertain a smith being able to shoe my horse."

The good judge—or anyone else caught in a fair of yesteryear—would have done well even to get a night's sleep, what with revelers jostling up to the hotel bar, fiddlers screeching out "Fine Fun at Our House," feet clumping and scraping on sanded floors or dirt streets as dancers swirled through square sets, jigs and reels. Down went "slings" and "fips" of whiskey or brandy; up went a four-wheeled wagon to the market house roof; off went valuables in the pockets of miscreants who might or might not wind up "under Confinement, for a Crime of that Nature."

By the time Yankee Doodle stepped out of the traces of his plow and marched off to fight the redcoats, market fairs seemed on their final frantic binge.

Later, head high, the free American citizen wore scratchy homespuns as a patriotic duty and kept his dreams of soft English woolens to himself. And he fed his dreams of prosperity at the agricultural fair.

A show for better farming

For several decades gentlemen farmers had been sharing their erudition through scholarly agricultural societies. Jefferson won a gold medal for a plow he invented, and someone took home another for his "account, verified by chemical experiments . . . of the nature of manures." Hardly the reading matter for the common farmer, even if he could read.

But when a market fair at Washington in 1805 offered a hefty $100 in prizes "to the best lamb, sheep, steer, milk cow, yoke of oxen, and horse actually sold," the farmer understood readily enough. The sale was becoming a show, and a spur toward better farming. A scant four years later the inversion was complete; he could pocket $60 for the best bull—and then sell the beast or not, as he wished.

A special prize awaited the man "shearing a sheep in the neatest, safest and most expeditious manner." In a nation newly hungry for wool, the sheep seemed indeed the king of beasts, and the man who sheared him fastest well deserved a prize.

He got one as early as 1803 when George Washington Parke Custis, the General's adopted son, held a "sheep-shearing" on his estate just across the Potomac from the nation's capital. Shaded by the General's old war tent, Custis reminisced about his younger days at Mount Vernon while contestants—each "a native American," mind you—clipped furiously and the assembled gentry discussed breeds and blood lines. No matter that the idea was an English one; the Arlington Sheepshearing swiftly became the decade's most popular country festival.

"In the Fall of 1807 . . . I was induced to notify an exhibition under the great elm tree in the public square in Pittsfield of these two sheep on a certain day." Thus "induced," Elkanah Watson, a Pickwickian businessman lately retired to Massachusetts to farm, pointed his bleating Merinos toward the big elm and earned himself a toehold in history.

This "first novel, and humble exhibition" was a smash; the rare Spanish Merino rippled with a deep,

silky fleece like nothing the Berkshire Hills had ever produced. The beasts were worth fortunes; elsewhere people were naming ships, a new kind of potato, and even their children Merino.

"I reasoned thus," wrote Watson, "if two animals are capable of exciting so much attention, what would be the effect on a larger scale, with larger animals?" His neighbors were less than enthusiastic; it took Watson three years to cajole 26 of them into launching the Berkshire Cattle Show. Even on the big day they "held back . . . for fear of being laughed at." But Watson led the way for a bucolic promenade around the square and a hearty "three cheers, in which they all united." Then they all went home, "well pleased with the day, and with each other"—and unaware that they had just given America the county fair.

Watson was a wonder. By the second year, 1811, he had formed the Berkshire Agricultural Society, lured exhibits with a $70 prize, and stretched the promenade to a half-mile spectacular complete with flags, a band, four mounted marshals, two textile machines spinning and weaving as wagons wafted them along, and a plow pulled by 60 yoke of oxen and steered by the two oldest plowboys the county could muster!

The next year he wrote boldly to John Adams, then head of a learned society of gentlemen farmers, asking for a slice of their unused prize fund. "You will get no aid from Boston," steamed the reply; "I cannot, I will not be more explicit." The unflappable Mr. Watson tripled the prize money anyway—and four years later got an apology when Adams' society borrowed his show idea!

Rural fairs have a golden age

Watson was the common farmer's messiah—and also his own best apostle. By 1819 nearly every county in New England had an agricultural society like his; this time Rhode Island was the lone holdout. The Berkshire System spread, slumped, spread again. And it still is represented in part by the Grange, the Farm Bureau, horticultural societies (one staged a rose show as early as 1829) and breed associations.

County fairs proliferated, state fairs sprang up, and world's fairs were just behind the tent flap. By mid-century we had entered the golden age of rural fairs.

"Extensive preparations will of course be made," promised the Bucks County, Pennsylvania, Fair of 1859, "to furnish amusement for the crowds of visitors at the Fair, in the way of concerts, side shows, and 'doings' generally." And what "doings" there were! ". . . the farmer, after a year's battling with soil and crops," saw at one "a 'grand tournament' of bicyclers, a balloon ascension, a 'young and handsome couple' married in the balloon and sent off in it, polo games, steeple chasing, football match, and racing by wheelbarrows, greased poles, sacks and horses." At another, "there were any number of *outside shows*; learned pigs, fat women, snakes, monkeys, all jumbling together in Babelish confusion, while lager beer saloons and melon stands supplied those in quest of such delicacies." At the Reading Fair of 1853 ". . . a company of Albino, a five-legged horse, Snake and Alligator Show and other catch-penny shows seemed to be doing a fair business." The midway had arrived. Hawkers invited the crowd to step right up. Milk at two cents a glass. Pear cider. Beer. Coffee brewed by the WCTU. Yards of taffy. A novel treat: "Hot Frankfort Sandwiches." And for any who slipped past this gastronomic gauntlet there lurked vendors with whistles, pinwheels and balloons, strolling photographers, pitchmen beckoning toward shooting galleries, ringtoss stands and Punch-and-Judy shows along dusty boulevards of delight.

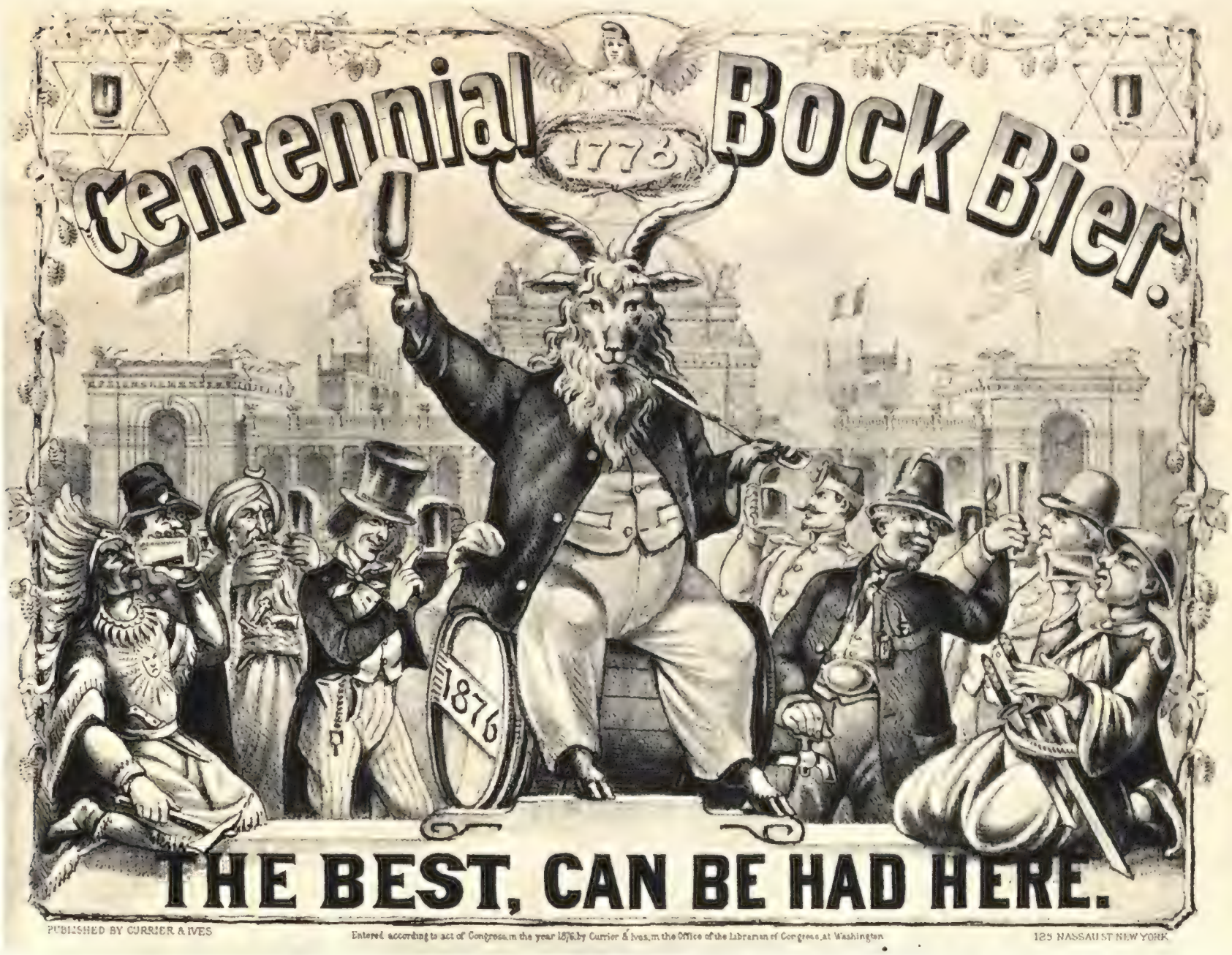
Contests for pickles and sheep

Prizes went for almost anything: $200 to a man who planted 5,000 fruit trees in a year; $500 for a steam plow that didn't work; two dollars for "Best set Embr'd Underclothes"; a silver plate and five dollars for "Best 3 spr'g & 3-seat'd wag'n"; a diploma for "Best Butter Firkins, oak." There were various awards for "velocipedestrianism"—over the howls of horsemen that the cyclists were invading their trotting track. And one matron collected a livestock award of sorts: 75 cents for "damages caused by mice."

Somewhere behind it all, the farmer still held his breath while a judge plunged knowing fingers into his ewe's carefully curried fleece. His wife bit her lip while tasters smacked theirs over her pickles or muffins or jam. His children took pen in trembling hand and wished Mr. P. R. Spencer had taught a script guaranteed to win the dollar for best penmanship. The farmer and his family still dominated the show, and everybody knew it.

But enthusiasm for their wares wasn't unanimous. ". . . Thare was two yoke ov oxens on the ground," joshed Josh Billings in 1868, "beside sevral yokes ov sheep and a pile ov carrots, and some worsted work, but they didn't seem to attrakt enny simpathy. The people hanker fur pure agrikultural hoss-trots." And "hoss-trots" they got.

Racing was easy to justify. In days when horses pulled both plow and carriage, what better way to show them off than by racing? Up sprang the mile track, grandstand and judges' box at fairgrounds everywhere. Sure enough, lads who thrilled to a three-minute trotting horse lived to see its sleek progeny pound around the dusty oval in less than two. "And in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When Philadelphia held the U.S. centennial fair Currier & Ives produced this joyous picture.

schooling," crowed a fair official as late as 1939, "the harness horses are getting almost the equal of what is given our boys and girls."

"... A school to promote in the minds of ... children a tendency to extravagance and immorality," snorted a Pennsylvania paper in 1869. Another reporter boycotted his county fair for doing "so little to encourage the honest sons of toil and so much for horse-racing, which is one species of gambling." (These were the same honest yeomen whose fair programs sold them butter coloring that would add "from 5 to 10 cents per pound to its value," and whose grandsons might shoot paraffin under a hide to reshape a lumpy steer.)

One orator was obliged to perform on the track between heats, while the horses cooled off and the betting warmed up. Another stoutly refused to perform at all; the animals were too much competition. Jockey clubs took over many a fair, or set up tracks of their own nearby and siphoned away the crowds.

And crowds were becoming easier to siphon. Better roads and growing railroads brought the distant spectaculars—state fairs, specialty shows, and those awesome world expositions—within the fairgoer's reach. Torn by bickering and eclipsed by the glitter just over the horizon, the county fair stepped quietly out of the limelight. And the 20th century stepped in.

What fairs we've seen since then! We rode the first Ferris wheel at the Columbian in 1893. We gaped at 100 horseless carriages and licked our first ice cream cones at the Louisiana Purchase in 1904. We braved our first airplane rides at the Panama-Pacific in 1915. We ogled a girl in a 500-yard silk gown and watched pint-sized battleships fire salvos during the Great Lakes Exposition in 1937. (The pageant was called *It Can't Happen Here;* a few years later we happened into World War II.)

And what state fairs! John Philip Sousa's band ... air races, auto races, motorcycle races ... the Anti-

Saloon League exhibits . . . the New Jersey crowds who lined up for free samples of a tasty new laxative and quickly lined up again at what carnival folk called the "donickers" . . . fireworks extravaganzas like "The Last Days of Pompeii" and "The Burning of Chicago" . . . head-on locomotive collisions . . . and that airplane demonstration in 1906 when the pilots earned a bonus if they got it off the ground.

And what livestock events! Wild-cow milking contests. Turtle races, crab derbies, frog hops. Dog shows, horse shows, fish shows. Miss Firmament pageants. Blind-date auctions where you bid on a boxed lunch and enjoy it with the lass who made it. (Rule of thumb: plain package, pretty girl.) In such guises the ancient fair grinds on.

But somehow I keep thinking back to Stinky. He's the duckling I took home from a Kansas fair when my dime clinked in a saucer and stayed in. And I can still feel the brute power just under the hides of Ol' Man Stetson's percherons as they dragged a sledgeful of weights at a Grange fair in Connecticut back when I knew how to get in free. Last time I looked, it was all still there.

In this day of Expo and HemisFair, Space Needle and Unisphere, the county fair (opposite) still clips a blue ribbon on a Hereford's brow, still crowns Miss Poland China, still shovels up its many manures, still seines quarters from the never-failing river of "marks" strolling along the midway. Its merry-go-round still wheezes out the old tunes, still sells to kids and codgers two minutes in Xanadu. The farmer may step from a sports car and buy an air-conditioned tractor with upholstered seat and radio, but when it's all over and the roustabouts strike the tents and the kootch dancers pull off their pasties and the merry-go-round grinds to a stop, he'll go home a little smarter, a little happier, a little older, a little younger. And so will you.

Prizewinners at this year's Logan County Fair in Lincoln, Illinois, included this Duroc-Jersey hog, the queen and her court—posed with a friend.

Surrounded by huge combines (these are for corn) farmers look at this year's models of harvesting equipment required for modern agriculture.

The Logan County Fair midway, seen from the Ferris wheel, has rides, sideshows and roller coaster.

Book reviews

The Human Environment and Business
Henry Ford II
(Weybright & Talley, $3.50)

It may or may not be surprising that Henry Ford II writes with the flow of logic which is as streamlined and irrefutable as a mathematical equation. His short book falls into three chapters which originally were lectures at the Vanderbilt University Forum, the Yale Political Union and the Harvard Business School Public Affairs Forum. One might think that such a volume would be disjointed, but the continuity here is admirable with very little repetition. The chapters are titled: "The Individual and the Establishment; Social Conscience and Profit and Business; the Environment and the Quality of Life."

Ford finds that much of the civilized world is undergoing a crisis of confidence in the way it is being run. Not just the students, the blacks and the draft resisters are in rebellion. Policemen, firemen, teachers and other public servants have organized and reached for the strike weapon. Splinter groups within unions refuse to go along with the majority. Taxpayers vote down bond issues, servicemen defy military discipline, the clergy challenge the hierarchies of their churches, and children have turned against the sexual mores or preachments of parents.

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Like many another spokesman and author of the day, Ford sees us heading for a situation in which our liberties could be lost either to tyranny of the mob or dictatorship of the government. But he has a solution. He sees a light.

The very fact that our society till now has tolerated so much dissent and diversity is proof that the rebels are being heeded and are getting their points across. Universities *do* listen to student protests, and big corporations *are* trying to please their workers, their dealers and their ultimate consumers.

This does not mean that the big institutions are going to collapse; they are here to stay. It does mean that now they are in for a period of reform, brought on by the rebels, who must learn to manage the reformation. Ford believes that major progress is seldom made because an Establishment changes its mind or its methods. Progress comes when an older generation leaves the field and a new generation takes over. Recognizing the idealism of the young, he is optimistic about the revolution and the future.

Both the extreme right and the extreme left, says Ford, declare that business is principally concerned with profit-making, and he agrees. Going one step further, he contends that profits and social conscience are perfectly compatible. It is in business' self-interest that people should have good wages, education and equal opportunity. He says we should resist the idea that profit is a poor reason for helping others. If you help a man because he needs it, you are treating him as an inferior. If you help him, hire him, upgrade his skills because you need him, you are treating him as an equal.

Since 1967, the Ford Motor Company has discarded the old theory that a man's future performance can be judged by his experience and schooling. The personal interview is far more effective in selecting the needed and valuable employees. As of February 1970, Ford had hired 20,000 persons, mostly Negroes, formerly thought to be unemployable.

As to the future, Ford sees all enterprises yielding to a new formula of supply and demand. The revolution of rising expectations will require producers, from manufacturers to educators, to give the consumer more quality and more relevance. People want machinery that doesn't pollute and doesn't malfunction, more emphasis in the schools on dignity, freedom and the cultural enjoyment of leisure in pleasant surroundings. The institutions which understand these demands will get the jump on the less-concerned competition.

In a spirited introduction, Yale President Kingman Brewster jr. justly compliments Henry Ford for bluntness and audacity.

—Holmes Alexander
syndicated columnist

America's Black Past: A Reader in Afro-American History
Edited by Eric Foner
(Harper & Row, $12.50)

The flood of books on black history places all of us who are interested in the subject in a quandary. On the one hand, books such as Eric Foner's *America's Black Past,* containing recent articles and excerpts from classics in the field, obviously provide an interesting introduction to Afro-American history to general readers. On the other hand, professional historians look upon such volumes as non-books: They add no new information to our store of knowledge and contain no startlingly fresh interpretations or resolutions of old controversies. Few of us would recommend publication of any manuscript which did not have at least one of these characteristics.

In spite of my bias against books of readings, Foner's volume is excellent. Unlike many of the worthless works now overwhelming us, the readings in *America's Black Past* were chosen with care. Each of the 21 sections of the book begins with an introduction that places the readings in historical perspective. Foner also includes an impressive bibliographical essay. Utilizing a judicious mixture of general essays and case studies, the author has given a good overview of the topic. Booker T. Washington, W.E.B. Dubois, the Harlem Renaissance, Abolitionism,

Slavery and Black Power are handled skillfully. Negroes in the Civil War and Reconstruction, however, are probably the weakest sections of the book. Inexplicably, the author has little on the role of Negro troops in the Civil War or the general participation of Negroes during Reconstruction.

In his introduction, Foner decries the tendency of historians, until recently, to portray "blacks as inactive agents in history." Consequently, he asserts, we have "little historical record of the independent ideas and activities of the black community." It is precisely because of this that most books of readings in black history represent a contradiction in terms. If we admit, as Foner does, that "Despite the fact that black and white historians have been writing black history for many years, the field is in many ways still in its infancy," then a book of readings in this area is similar to a large picture album of a new baby—most of the pages are, of necessity, blank. Because they know little about black history, most compilers of books of readings, in their anxiety to make money quickly, all reproduce practically identical essays.

To Foner's credit, he has realized the paucity of available material and has taken the time to uncover essays which illustrate those themes which historians have investigated. Consequently, he has produced a volume with few "blank" pages and few of the tired old essays with which neo-capitalistic "historians" clutter their works. He has been so successful that even a diehard opponent of books of readings like the reviewer recommends *America's Black Past* highly.

—John W. Blassingame, professor of black history and author of black studies article in SMITHSONIAN, *April, 1970*

The Heroic Triad
Paul Horgan
(Holt, Rinehart and Winston, $7.95)

Not many writers can return to the pages of a former triumph and extract from it another volume as arresting, in its way, as the original. But then, there are not many writers like Paul Horgan still riding across the increasingly murky literary landscape in America.

Horgan's career has been typical of some of the best writers in America—until now, he has been honored and comparatively well read, but has never made much money. The success before publication of his forthcoming novel, *Whitewater*, will remedy that situation. But this richly deserved success comes only after 12 novels, nine other works of fiction, and 10 other volumes of history and nonfiction besides the one under review. It is a long road from his first, prize-winning novel, *The Fault of Angels.*

In all these books, there is scarcely a meretricious line. Horgan truly respects his craft and understands the uses and the beauty of language. Nowhere, in all this work, is that quality better exemplified than in his *Great River: The Rio Grande in North American History,* the chef d'oeuvre of his career, which won two major prizes, the Pulitzer and the Bancroft, besides other honors. It is to this vast and beautiful mine that Horgan has returned for the collection of essays he has titled *The Heroic Triad.*

The content of this collection is familiar to those who know the original masterpiece, but the essays have been arranged in sections to illuminate the lives of the people who have inhabited the American Southwest: the Pueblos and their culture; the conquering Spaniards and their Mexican sons, who unite past and present; and the Anglo-American "sons of democracy" who look toward the future.

It is easy to summarize the plan of the *Triad* book, but more difficult to convey its style and feeling. As a novelist, Horgan has always been a poetic writer, with an intense feeling for imagery, and he brings this quality to his nonfiction, much as Truman Capote does in his quite different style. A single sentence tells how: "Canyon silence is made of many sounds, and their echo is loud in the memory—deep rush of water, silky play of breeze, the talk of aspen leaves clattering in their new green, the metallic strike of a dislodged rock bounding down to the water, the piercing astonishment of the call of the male canyon wren. . . ."

With this kind of prose, Horgan distills from the half-million words of *Great River* the essence of the dominant cultures in the lands watered by that mighty stream. As the author says, they are cultures which have "violently distinct characters," and he sees them projected against the landscape of Southwestern history in terms of beliefs, customs, group behavior and social energy—the elements which give the cultures their distinction.

Of the Pueblo Indians, Horgan writes in *Triad*: "They solved with restraint and beauty the problem of modest physical union with their mighty surroundings."

Of the Spaniards: ". . . a great civilization, having reached heights of expression in the arts of painting, poetry, architecture, faith, and arms, subsided across the world into the culture of the folk."

Of the Anglo-American cowboy: "In him, the last . . . to live a life of wild freedom, his domesticated compatriots saw the end of their historical beginnings...."

It is singularly refreshing to find a historian writing about the history of music in America, observe: "In a more popular vein the fife became the rage. Its shrillness and panic vivacity suggested the state of the national feeling. With little stinging scales it challenged the conservatism of the past, forcing an animated vision of a future as brisk and insistent as its own voice." These lines tell us more about the past than the entire collected writings of the contemporary sociologists of history.

—John Tebbel, Professor of Journalism, New York University

Artists who recorded the young United States

Painters of America

By Dorothy Heiderstadt

The lives of fifteen famous American artists who recorded the vanished American scene in such paintings as: Bingham's river and frontier pictures; Miller's interior of Fort Laramie; Catlin's Indian paintings; and the Western scenes by Remington, Russell, and Schreyvogel. Illustrated with fifteen photographs of the paintings and a full color jacket. *Bibliography. Index.* $4.95

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Smithsonian

Highlights

Traveling Exhibition Service

Some of the more than 70 Smithsonian exhibits that will appear throughout the country during October are:

Riviera Beach, Florida—"Black/White" (Contemporary Art Center of the Palm Beaches, opening October 3).
Washington, D.C.—"The Historic Architecture and Urban Design of Nantucket" (Octagon House, opening September 29).
Kent, Ohio—"Early Chicago Architecture" (Kent State University School of Architecture, through October 11).
Clemson, South Carolina — "Georgian Country Houses" (Clemson University School of Architecture, to October 15).
Pensacola, Florida—"People Figures" (Pensacola Junior College, opening September 26).
El Cahon, California — "Synchromies" (Grossmont College, opening October 3).
Santa Barbara, California—"The Concerned Photographer" (Santa Barbara Museum of Art, through October 11).
Austin, Texas—"Mexican Folk Art" (Laguna Gloria Art Museum, to October 18).

Museum of Natural History

Two photography shows here until November 17 are: "Stephen Whealton," an exhibition of Polacolor prints, slides and other photographic derivations and "Janine Niepce," 40 photographs by this French photojournalist.

"Mohandas Karamchand Gandhi," a special exhibition commemorating the centennial of the Indian leader's birth, will be on display through October 12.

Museum of History and Technology

"Smithsonian Scientists Study the Moon Rocks" is a photographic show on the investigation of the contents of the moon rock specimens.

National Portrait Gallery

"The Life Portraits of John Quincy Adams" is a major exhibition of portraits mainly from life of America's sixth President and his wife (see article page 24 this issue).

National Collection of Fine Arts

"H. Lyman Sayen" is the first major exhibition of oils, watercolors and drawings of the Philadelphia-born (1875-1918) artist who became an expatriate in Paris at the turn of the century.

Division of Performing Arts

Saturday Night Jazz, in conjunction with the Left Bank Jazz Society, will give concerts October 17 and 31 in the auditorium of the Museum of Natural History at 8:30 P.M.

Smithsonian Museum Shops

"The Crafts of Georgia," in the Arts and Industries Shop, features the work of the finest contemporary craftsmen from the State of Georgia, U.S.A.

Arts and Industries Building

In addition to the one-pound piece of Apollo 11 moon rock, an Early Bird Satellite—the operational backup model for the world's first commercial communications satellite—is here indefinitely. Also Neil Armstrong's space suit lunar visor is on display.

"Finnish Design: Tapio Wirkkala" is a collection of nearly 300 objects by this versatile designer in stainless steel, plastic, glass, silver and porcelain.

"Genteel Female," lithographs from the Smithsonian's Harry T. Peters America on Stone Collection, depicts a romantic view of the American woman of the 19th century.

"Woman—Aspects of a Grand Theme," an international exhibition of over 500 photographs by 236 photographers from 85 countries, has its first U.S. showing here (see photograph below).

Photographic Show on women includes a picture of Sophia Loren and Carlo Ponti by Tazio Secchiardi.

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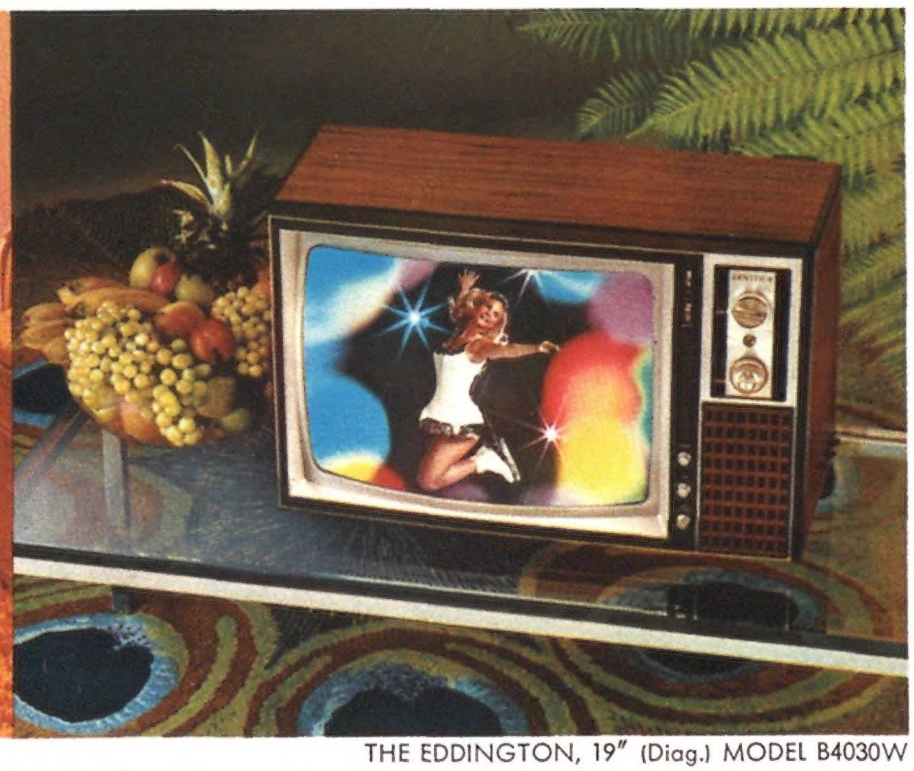

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